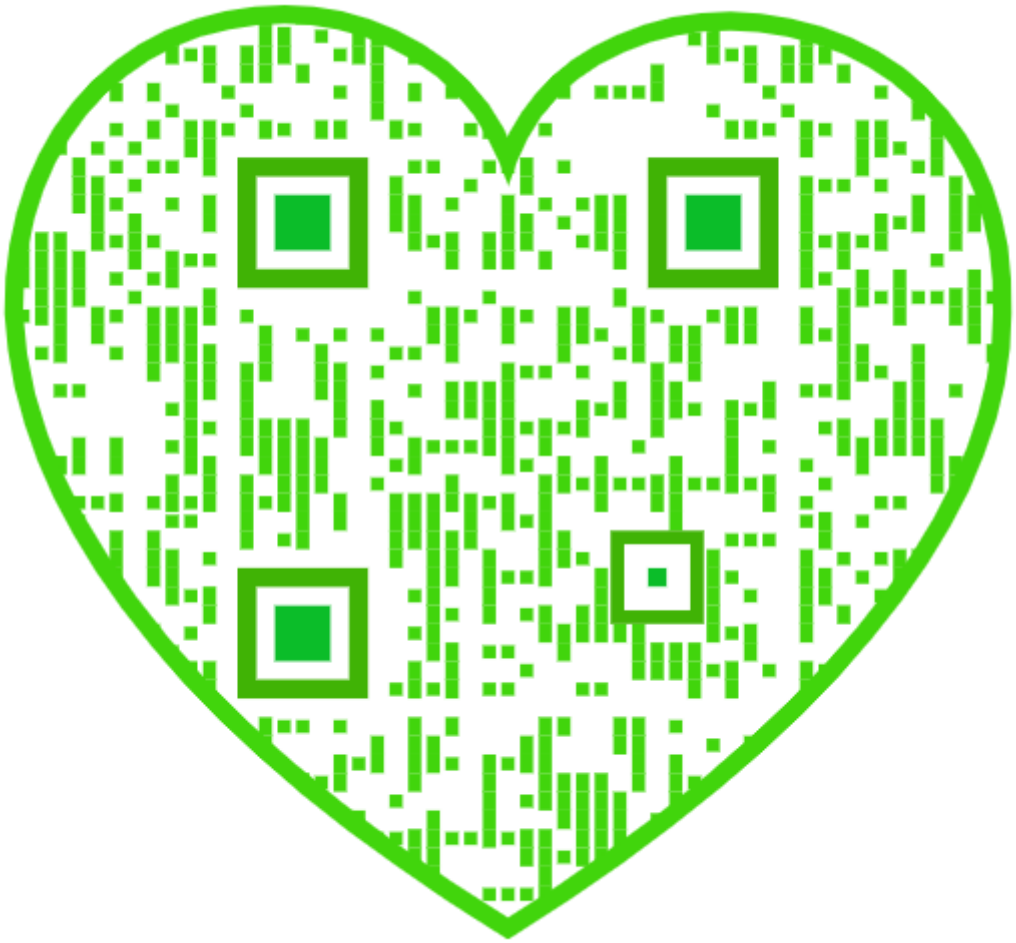

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CHRISTABEL

KEY TO PRONUNCIATION.

ā	far, father
ā	fate, hate
a or ă	at, fat
ã	air, care
ạ	ado, sofa
â	all, fall
ch	choose, church
ē	eel, we
e or ĕ	bed, end
ė	her, over: also Fr. *e*, as in *de; eu*, as in *neuf;* and *ocu*, as in *boeuf, coeur;* Ger. *ö* (or *oe*), as in *ökonomie.*
ę	befall, elope
ë	agent, trident
ff	off, trough
g	gas, get
gw	anguish, guava
h	hat, hot
h or H	Ger. *ch*, as in *nicht, wacht*
hw	what
ī	file, ice
i or ĭ	him, it
î	between e and i, mostly in Oriental final syllables, as, Ferid-ud-din
j	gem, genius
kw	quaint, quite
ṅ	Fr. nasal *m* or *n*, as in *embonpoint, Jean, temps*
ñ	Span. *ñ*, as in *cañon* (căn'yŏn), *piñon* (pēn'yōn)
ng	mingle, singing
nk	bank, ink
ō	no, open
o or ŏ	not, on
ô	corn, nor
ȯ	atom, symbol
ọ	book, look
oi	oil, soil; also Ger. *eu*, as in *beutel*
ō or oo	fool, rule
ou or ow	allow, bowsprit
s	satisfy, sauce
sh	show, sure
th	thick, thin
ṯh	father, thither
ū	mute, use
u or ŭ	but, us
ů	pull, put
ü	between u and e, as in Fr. *sur*, Ger. *Müller*
v	of, very
y	(consonantal) yes, young
z	pleasant, rose
zh	azure, pleasure
′(prime), ″(secondary)	accents, to indicate syllabic stress

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C

CASTE, a social class whose burdens and privileges are hereditary. The word is from the Portuguese *casta*, race, and was applied by the Portuguese, who became familiar with Hindustan, to the classes in India whose occupations, privileges and duties are hereditary. This term is sometimes applied to the hereditary classes in Europe; and we speak of the spirit or the prerogatives and usurpations of a caste, to express particularly that peculiar constitution of society which makes distinction dependent on the accidents of birth or fortune. The division into castes, where it appears in its most typical form, comes to us from a period to which the light of history does not extend; hence its origin cannot be clearly traced: but it is highly probable that wherever it exists it was originally grounded on a difference of descent and in modes of living, and that the separate castes were originally separate races of people. This institution has been found among many nations. According to the accounts collected by Clavigero, some traces of it were apparent among the Peruvians and Mexicans; but it prevails principally in the East, where it has existed from the earliest times, and has become blended with the political condition of the people. The division into castes was entirely interwoven in the whole fabric of civil society, in ancient Egypt, in India and ancient Persia. In Egypt this division was supposed to have been perfected as a political institution in the flourishing period of the Pharaohs; and the lines of separation which had been drawn in earlier times by a difference of descent and different modes of living were then rendered still more distinct. The number of castes in that country is variously stated by Herodotus, Plato, Diodorus and Strabo. Recent evidence however has made the existence of a strict caste system in Egypt rather doubtful. The institution of caste is best known to us as it exists in Hindustan, where it is well known to have existed since perhaps 1,500 or 2,000 years before the Christian era. The great Indian castes are four in number, namely, the Brahmans or sacerdotal class; the Kshatriyas or military class; the Vaisyas or mercantile class; and the Sudras or servile class. The division of castes in ancient Persia was essentially similar, as one would expect on the basis of the intimate relation between the religions of two countries. The three Indian castes first named are regarded as being altogether of a higher character than the fourth, rejoicing in the peculiar religious distinction of being "twice-born" as contrasted with the "once-born" Sudras. This distinction is undoubtedly ethnical in its origin, the twice-born castes being descendants of the Aryan invaders and conquerors of the country, while the once-born are the representatives of the conquered. Caste, however, is a much more complicated thing than would be supposed from this brief statement, since the principle of caste classification according to employment as well as to race has long prevailed, and from early times there has been an intricate mingling of castes. At present, marriage within the caste is general. However, the wife is allowed to be of a lower caste than the husband, provided the children revert to the lower or to an intermediate caste. The Brahmans are the sacerdotal caste, but, according to Sir W. W. Hunter ('The Indian Empire,' 2d ed., 1893), "Even among the Brahmans, whose pride of race and continuity of tradition should render them the firmest ethnical unit among the Indian castes, classification by employment and by geographical situation, plays a very important part; and the Brahmans, so far from being a compact unit, are made up of several hundred castes, who cannot intermarry or eat food cooked by each other. . . . In many parts of India, Brahmans may be found earning their livelihood as porters, shepherds, cultivators, potters and fishermen, side by side with others who would rather starve, and see their wives and little ones die of hunger, than demean themselves to manual labor, or allow food prepared by a man of inferior caste to pass their lips." Altogether some 1,886 separate Brahmanical tribes have been enumerated, and the Kshatriyas or Rajputs now number 590 tribes in different parts of India. "In many outlying provinces we see non-Aryan chiefs and warlike tribes turn into Aryan Rajputs before our eyes. Well-known legends have been handed down of large bodies of aliens being incorporated from time to time even into the Brahman caste." While there has been a tendency in the different provinces for every separate employment to develop into a distinct caste, there are also instances of castes changing their employment and raising themselves in the social scale. Thus the Vaisyas, who were anciently that Aryan caste upon whom the tillage of the soil fell, have become the merchants and bankers of India, leaving to the Sudras and mixed

castes the labor of cultivation. "Each caste is to some extent a trade-guild, a mutual assurance society, and a religious sect. As a trade union it insists on the proper training of the youth of its craft, regulates the wages of its members, deals with trade delinquents, supplies courts of arbitration and promotes good fellowship by social gatherings. . . . The caste or guild exercises a surveillance over each of its members, from the close of childhood until death. If a man behaves well he will rise to an honored place in his caste; and the desire for such local distinctions exercises an important influence in the life of a Hindu. But the caste has its punishments as well as its rewards. The fine usually takes the form of a compulsory feast to the male members of the caste. This is the ordinary means of purification or of making amends for breaches of the caste code." A person who has become an "out-caste," or lost his caste position and privileges, may generally recover them in this way. In southern India the castes are divided into two large classes, those of the right hand and those of the left hand. The suggestion has been made that this is a survival of Buddhism.

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CASTEL VETRANO, vā-trä'nō, Sicily, town in the province and 27 miles southeast of Trapani, on a rocky hill. It lies in a fertile district, is regularly built, has several churches, grammar school with municipal museum of antiquities, many of whose objects were found at Selinus, in the vicinity. Grapevines, olives and rice are extensively cultivated. The white pine produced in the neighborhood is esteemed the best in Sicily. Articles of coral and alabaster are manufactured here. Pop. 25,000.

CASTÉLAR, käs-tā-lär', Y RIPOLL, Emilio, Spanish orator and statesman: b. Cadiz, 8 Sept. 1832; d. Murcia, 25 May 1899. He was left an orphan when quite young and his early life was spent in boarding schools. At the Institute of Alicante (1845–48) he was distinguished for his ability to memorize, for his intellectual grasp and his oratorical powers. His knowledge of philosophy, history, literature and the Latin and Greek classics was very extensive, in fact, much more so than of law, which he went to Madrid to study in 1848. He obtained his degree in law in 1852 and that of doctor of literature the following year. On leaving the university Castelar entered political life as a member of the Progressive party and before the end of the year he had already become a noted character, thanks to his wonderful oratorical gifts, and one of the shining lights of republican democracy. His youthful speeches were collected, published and spread broadcast by the ultra-Republicans, and the press of Madrid opened its arms to him. He accepted a position as editorial writer on *El Tribuno,* which he left some time later, when the latter went over to the monarchy. He joined the staff of the *Soberanía Nacional,* which he also left when the latter became altogether radical. Finding *La Discusion,* whose staff he next joined as chief editorial writer, too timid in its advocacy of Republican principles, he founded *La Democracia,* dedicating it to the overthrow of the monarchy and the house of Bourbon (1864–66). He took part with the Democrats against the Socialists. It was at this period that he wrote and published, in the *Ateneo,* 'La historia de la civilización en los cinco primeros siglos del cristianismo' (1855–58). In the latter year he became professor of Spanish history in the Central University. This gave him an opportunity to preach from two great tribunals, the university and the press, his democratic ideas. He was finally deprived of his chair in the university on account of his radical republicanism. The substitute professors in the department of Spanish history at once resigned out of sympathy with Castelar; and this was followed by a revolutionary demonstration which was put down with considerable bloodshed (10 April 1865). But the revolutionary fire was still smouldering and very active plotting went on in secret. Castelar, arrested in 1866 for participating in revolutionary activity, was tried and condemned to be hanged; but he succeeded in escaping, in disguise, to France, where he continued his editorial, journalistic and literary work and wrote 'Semblanzas,' 'Un año en Paris,' 'Recuerdos de Italia,' 'Vida de Lord Byron' and 'Introducción al estudio de la historia.' He was one of the most active spirits among the revolutionary party in Paris, and on the triumph of the latter in 1868 he returned to Spain, resumed his chair in the university and was elected a member of the Cortes, where he became the leading advocate of republicanism and the most distinguished orator of the nation. On the establishment of the republic in 1873 Castelar became Minister of State. He was instrumental in the abolishment of the military orders of Santiago, Calatrava, Alcántara, Montesa and San Juan de Jerusalén; and later on, those of Carlos III, María Luisa and Isabel la Católica. On 6 Sept. 1873 he was elected president of the executive, a position he held until the following January, when a counter revolution once more forced him into exile in France, where he continued actively his literary work. He finished his 'Historia del movimiento republicano en Europa' and the second part of 'Recuerdos de Italia,' 'La redención del esclavo' (poem) and 'El ocaso de la libertad.' Returning to Spain in 1876 he was elected to the Cortes, of which he remained an active and prominent figure for 17 years, always dreaming of the ultimate establishment of the Spanish republic by peaceful means. Thus his discountenancing revolutionary means to gain revolutionary ends helped the cause of the monarchy and of law and order, although he continued the leader of the opposition. Gradually he greatly modified his republican and revolutionary attitude until he had come, in 1893, to see that Spain was not yet fit for any other than a monarchical form of government.

Castelar was the mouthpiece of the Repub-

lican ideal in Spain, which his brilliant oratorical gifts, his writings and his ceaseless activity kept constantly before the people. He fought for universal suffrage and the abolition of slavery in Porto Rico; he defended the principle of religious liberty; advocated the election by popular vote of the *alcaldes;* and he was a powerful champion of universal military service. He strongly influenced the politics of his age in Spain; and this influence extended to all the Latin countries in Europe and America. His literary works, which are very voluminous, include, in addition to those already mentioned, the following: 'La revolución religiosa'; 'Perfiles de personajes y bocetos de ideas'; 'Estudios históricos sobre la Edad Media'; 'La fórmula del progreso'; 'Defensa de la fórmula del progreso'; 'La cuestión de Oriente'; 'Cuestiones políticas y sociales'; 'Cartas sobre política europea'; 'Recuerdos y esperanzas'; 'La rendición del esclavo'; 'La hermana de la caridad'; 'Historia de un corazón'; 'Discursos políticos y literarios'; 'Fra Filippo Lippi'; 'Tragedias de la historia'; 'El suspiro del Moro'; 'Discurso de recepción en la Academia Española'; 'Discurso en la Coruña sobre literatura gallega'; 'Galería historica de mujeres célebres.'

CASTELEIN, käs'tē-līn, **Matthiis de,** Dutch poet: b. Pamele (Oudenarde) 1485; d. 1549. He was the acknowledged lawgiver and pattern of all the Dutch rhetoricians of his time in his 'De Cunst van Rhetoriken' (1555). He composed many plays, but only two of them were published; one of these is the 'Story of Pyramus and Thisbe.' He wrote also a volume of 'Diversche Liedkens,' in melodious verse.

CASTELLAMARE, käs-tĕl-lā-mä'rē, or **CASTELLAMMARE DI STABIA,** Italy, a seaport town on the Gulf of Naples, 17 miles southeast of the city, at the beginning of the peninsula of Sorrento, and 10 miles northeast of that town. It extends for a mile along the shore at the base and on the slope of a spur of Monte Sant' Angelo (4,735 feet high), a mountain which commands a splendid prospect. From its pleasant surroundings, shady walks, sea baths and other attractions it is a favorite summer resort of the Neapolitans, as well as tourists, and has several good hotels, one of them formerly a royal residence. The harbor is protected by a mole and there is an arsenal with a dockyard. It contains a technical school, a theatre and a large royal arsenal. The principal imports are grain, coal and iron; the principal exports wine and fruit. The fisheries are important, and there are macaroni, soap, leather and cotton factories. The town owes its name to a castle built by the Emperor Frederick II in the 13th century. Castellamare occupies the site of the ancient Stabiæ, overwhelmed, with Herculaneum and Pompeii; by an eruption of Vesuvius, 79 A.D.; and it was here that the elder Pliny met his death by approaching too near the mountain while it was in a state of eruption. The modern town was afterward built from the ruins of Stabiæ. Here in 1799 the French general, Macdonald, defeated the allied English and Neapolitan forces. Pop. about 33,000.

CASTELLAN, or **CHÂTELAIN,** properly the owner or commander of a castle. In Flanders and France the title went with the possession of certain districts, and in Normandy and Burgundy châtelains ranked next after bailiffs, with both civil and military authority. In Germany the châtelains were Imperial officers with military and civil jurisdiction in fortified places. Consult Luchaire, 'Manuel des institutions françaises' (Paris 1892).

CASTELLANE, käs'tĕl-lān', **Esprit Victor Elizabeth Boniface,** COUNT OF, French marshal: b. Paris, 21 March 1788; d. Lyons, 16 Sept. 1862. He entered the army in 1804 and took part in most of Napoleon's campaigns. After the Restoration he became colonel of the Hussars of the Royal Guard. He fought in Spain (1823) and at the siege of Antwerp (1832), and as lieutenant-general commanded the Army of the Pyrenees. In the February revolution (1848) he lost his command, and in consequence went over to Louis Napoleon. In 1850 he became commander at Lyons and in 1852 marshal and senator. His 'Memoirs,' published in 1896, though crude in style, are valuable for their mass of minute detail.

CASTELLANETA, cās-tĕl-lā-nā-ta, Italy, city of Bari delle Puglie province, 24 miles northwest of Taranto. It is a thriving trade centre for local produce, olives, fruit, wool and cotton, and is a bishop's see with an interesting cathedral. Pop. 11,550.

CASTELLI, käs-tĕl'lē, **Benedetto,** a pupil of Galileo: b. Brescia 1577; d. Rome 1644. He was a monk and became abbot of a Benedictine monastery of the congregation of Monte Cassino. He afterward became a professor of mathematics and taught with distinguished success both at the University of Pisa and at the Collegio della Sapienza at Rome. Torricelli was his pupil. He distinguished himself in hydraulics and rendered important services to Urban VIII in his projects for the regulation of Italian rivers. He may be regarded as the founder of that branch of hydraulics which relates to the velocity of running water, though his fundamental principle, that the velocity is proportional to the height of the reservoir, is inaccurate, and was demonstrated to be so by Torricelli, who showed that the velocity is proportioned, not to the height, but to the square root of the height. In his investigations as to the measurement of time Castelli made use of the pendulum. His principal work, entitled 'Della Misura dell' acque correnti,' published at Rome in 1628, was translated into French in 1664.

CASTELLI, Ignaz Franz, Austrian dramatist: b. Vienna, 6 May 1781; d. there, 5 Feb. 1862. He was educated for the law, but following his inclination for the drama, gained access to the orchestras of theatres as a player of the violin. His circumstances compelling him to look out for some means of support, he accepted various subordinate offices, but using his leisure in composing patriotic songs for the Austrian army, he was brought into favorable notice. His songs having given umbrage to Napoleon, he fled to Hungary. In 1815 he accompanied Count Cavriana as secretary to Paris, and afterward he served in the same capacity with Baron Münch von Bellinghausen in Upper Italy. Because of the success of his opera, 'Die Schweizerfamilie' (music by

Weigl), he was appointed court poet at the Kärntnerthor Theatre. In 1840 he retired with a pension and the office of state librarian. The author of many poems, popular songs and miscellaneous writings, he was at various times connected with the press of Vienna, but is best known by his voluminous productions for the stage. Over 100 plays, partly adapted from the French, partly original, are attributed to him. He was a zealous collector of plays, handbills of the theatre and portraits of actors, covering the years from 1600–1862. The collections are now at Vienna in the Imperial Library. In 1848 more than 100,000 copies of his political pamphlets in favor of the Revolution found eager purchasers. His most popular drama was 'Die Waise und der Mörder.' His last publication was his 'Memoiren meines Lebens' (4 vols., 1861–62).

CASTELLIO, käs-tĕl'lĭ-ō, **Sebastianus,** French theologian and humanist, translator of the Bible into pure and classic Latin; he was a native of Dauphiny: b. 1515; d. Basel 1563, in exile and in extreme poverty. His family name was Châteillon, which he latinized after the fashion of that time into Castellio. At the invitation of Calvin he settled at Geneva, where he became professor of the ancient classic literatures, but because of differences regarding questions of religious belief he was deposed from the professorship and banished from Geneva. His Latin version of the Bible retained little or nothing of the profoundly Hebrew character of the scriptural writings and was justly censured by Calvin and the Calvinists. Theodore Beza, to offset this "work of Satan," as he called it, made a Latin translation of the Bible himself, striving to retain the Oriental flavor of the original in every respect. Castellio also wrote a book in defense of the right to hold and publish views deemed by Church and state to be heretical; this, too, evoked a reply from Beza. Castellio wrote also a tractate on 'Predestination Opposed to the Views of Calvin'; it was published after the author's death by Faustus Socinus in 1578.

CASTELLO, käs-tĕl'lō, **Gabriele-Lancilotto,** Sicilian antiquary, PRINCE OF TORREMUZZA: b. Palermo 1727; d. 1794. He studied science and archæology. He formed a splendid collection of the remains of antiquity found in Sicily. He bequeathed a large quantity of books, etc., to the public library of Palermo. At his death he was honorary member of the Royal Society and of the Academy at Paris. His important works are 'Storia d'Alesa, antica città di Sicilia' (Palermo 1753); 'Inscrizioni Palermitane' (1758); 'Siciliæ populorum veteres nummi' (1781); 'Siciliæ et adjacent veteres Inscriptiones' (1769).

CASTELLOBRANCO, Camillo, Portuguese novelist and poet: b. Lisbon, 16 March 1825; d. 6 June 1890. He studied in Oporto and Coimbra with great irregularity and entered the career of letters. After a short journalistic career in Oporto and Lisbon he entered the Episcopal Seminary and took minor orders. His restless nature prevented his adherence to this course and he abandoned it to resume a feverish literary activity. Having lost his sight, and suffering from a nervous disease, he committed suicide. He is the most popular of the modern romancists of Portugal, and at the same time the most national in tone, spirit and form. He composed romantic novels, of which the most notable are 'O Romance de un Homem Rico' and the series, 'Novellas do Minho.' To the romances he owes his reputation. His novels of manners created a new style of narrative, in which he describes with great nicety the social and domestic life of Portugal in the 19th century. In the domain of history, biography and literary criticism he is the author of 'Noites de Lamege'; 'Cousas leves e pesadas'; 'Cavar em ruinas'; 'Memorias do Bispo do Grão Para'; and 'Bohemia do Espirito.' His verses are mediocre. His collected works have been published by the Companhia Editora of Lisbon. Consult Freitas, 'Perfil de Camillo Castello Branco' (São Paulo 1889); Osorio, Paula, 'Camillo, a sua vida, o suo genio, a sua obra' (Oporto 1908).

CASTELLON, käs-tĕl-yōn', **Francisco,** Nicaraguan revolutionist: b. about 1815; d. 2 Sept. 1855. He was the leader in a revolt at Leon in 1853, which was unsuccessful, and fled to Honduras, whence he returned in June of the next year. It was largely by his invitation that the filibustering expedition under William Walker (q.v.) went from the United States in 1854. See NICARAGUA, HISTORY.

CASTELLÓN DE LA PLANA, Spain, capital of the province of Castellón, 40 miles north-northeast of Valencia. It stands in a large and fertile plain, watered by the Mijares, from which an ample supply of water is brought into the town by an aqueduct supposed to have been constructed by Jayme I of Aragon, who, in 1233, wrested Castellón from the Moors. It is well built and has considerable manufactures of sailcloth and woolen and hempen fabrics, ropes, porcelain, leather, cork, etc., and some trade in hemp, grain and fruit. The painters Ribalta, father and son, were born here. The original town occupied a hill north of the present site. Pop. of town 32,309; of province, 322,537.

CASTELNAU, kas-tĕl'nō, **Edouard de Curières de,** French general: b. Saint-Affrique 1851. He entered the Saint-Cyr military school in 1869, and in the following year, when the Franco-Prussian War broke out, he was given a commission. He served through the whole campaign and emerged with the rank of captain. During the Commune he took part in the street fighting. For over 40 years de Castelnau was one of that little band of French soldiers — Joffre, Gallieni, Foch, etc.— who devoted their entire strength to the problem of preparing the army against a repetition of the disasters of 1870–71. He rose through the successive grades, passed the Ecole de Guerre, was promoted general in 1906 and became chief of staff to General Joffre when the latter was designated (in 1913) as commander-in-chief in case of war. The two men had long worked together and closely studied all possible aspects of a future war. At the commencement of the European War de Castelnau was placed in command of the Army of Lorraine, charged with the defense of Nancy. His forces were drawn up across the Gap of Nancy to prevent the army of the Crown Prince of Bavaria from turning the Allied front. The

fiercest fighting on this sector began 6 Sept. 1914, when the Bavarians were incited to make a desperate, overwhelming assault. Without intermission the battle raged for three days. By the 12th the main fighting was over; Nancy was saved; de Castelnau's resistance contributed directly to the victory of the Marne. In 1915 he commanded the French offensive in Champagne and was made chief of the general staff when General Joffre was appointed commander-in-chief of all the armies of France. General de Castelnau lost three sons on the battlefield during the first two years of the war.

CASTELNAU, Francis, Comte de, French traveler: b. London 1812; d. Melbourne, Victoria, 4 Feb. 1880. He traveled extensively in Canada, the United States and Mexico, and under the protection of the French government undertook an exploration of South America in 1843, accompanied by D'Osery, a botanist; Weddell, a botanist; and Deville, a taxidermist. After his return to France, in 1847, Count Castelnau published 'Expedition dans les parties centrales de l'Amérique du Sud' (1850–51), a work in six volumes, of which one was by M. Weddell. Castelnau afterward traveled in Arabia, and was successively consul at Bahia, the Cape of Good Hope and Singapore, and at the time of his death was consul-general at Melbourne.

CASTELNAUDARY, kās-tĕl-nō-dā-rē, France, a town in the department of Aude, on a height above the Canal du Midi, 22 miles west-northwest of Carcassonne. It was built by the Visigoths on the site of a rich town which had been destroyed, and was named Castellum Novum Arianorum, from which its present name is corrupted. It rises in the form of an amphitheatre, and was anciently the capital of a district and strongly fortified. It was the scene of much barbarity by the inquisitors in 1237, was almost totally destroyed by Edward the Black Prince in 1355 and is famous for the battle fought beneath its walls in 1632 between the troops of Louis XIII and those of Gaston of Orleans, which resulted in favor of Louis chiefly in consequence of the inactivity of the Duke of Orleans. The Duke of Montmorency was wounded in this battle and taken prisoner, and afterward executed at Toulouse by order of the King, Louis XIII. It is indifferently built, has manufactures of coarse cloth, several distilleries and tanneries and one of the largest grain and flour markets in the south of France. It contains specimens of mediæval architecture, among them the church of Saint Michel (14th century). Pop. about 10,000.

CASTELNOVO, kās-tĕl-nō'vō, **Leo di.** See Pullè, Leopoldo, Count.

CASTELNUOVO, kās-tĕl-nwô-vō, **Enrico,** Italian novelist: b. Florence 1839. His stories have attained great popularity; among them 'Prof. Romualdo' (1878); 'Two Conventions' (1885); 'Reminiscences and Fancies' (1886). He is one of the acknowledged Italian masters of the "novel of the inner life" (romano intimo).

CASTELVECCHIO, Riccardo, rē-kär'dō kās-tĕl-vĕk'ē-ō. See Pullè, Giulio, Count.

CASTER-KELLNER ELECTROLYTIC PROCESS. See Electrochemical Industries.

CASTI, käs'tè, **Giambattista,** Italian poet: b. Montefiascone 1721; d. Paris, 7 Feb. 1803. He studied at Montefiascone, became professor there, was appointed a canon and made a journey to France. Receiving an invitation from the Prince of Rosenberg, who became acquainted with him in Florence, he went to Vienna and was presented to Joseph II, who knew how to appreciate the genius of the poet, and delighted in his conversation. Casti took advantage of every opportunity of visiting other courts and joined several embassies without office or title. Catherine II received him in the most flattering manner. He visited also the court of Berlin and several other German courts. After his return to Vienna, Prince Rosenberg, the director of the Imperial Theatre, caused him to be appointed *poeta Cesareo* on the death of Metastasio. After the death of Joseph II Casti requested his dismission and retired to Florence, where he wrote many of his works. In 1783 he went to Paris. His 'Novelle galanti' were republished at Paris (1804), under the title 'Novelle di Giamb. Casti' in three volumes. They are 48 in number. Almost all are of a licentious character, but written in a lively, original and graceful style. The same may be said of his didactic-satirical poem, 'Gli animali parlanti, poema epico di Giamb. Casti' (Milan 1802, 5 vols.). There are translations of it in French, German and English. Casti's 'Rime anacreontiche' are pleasing, and his comic operas, 'La grotta di Trofonio' and 'Il re Teodoro in Venezia,' etc., are full of wit and originality. His letters have been published in 'Miscellanea di storia italiana' (Vol. XII, Turin 1883). Consult Tommaseo, N., 'Dizionario d'Estelica' (Vol. II, p. 75, Milan 1860); Foscolo, 'Opere' (Vol. IV, Florence, 1850–62).

CASTIGLIONE, käs-tĕl-yō'nā, **Baldassare,** Italian writer: b. Casatico, in the territory of Mantua, 1478; d. 8 Feb. 1529. He studied at Milan, and entered into the services of the Duke Ludovico Sforza, and afterward of the Duke of Urbino, of whose elegant and splendid court he soon became an ornament. By him he was sent as an envoy to Henry VII of England, and afterward in the same capacity to Louis XII, at Milan. In 1513 Castiglione appeared as ambassador at the court of Leo X, where he became intimate with the most distinguished literati and artists. In 1521 he obtained for the new Duke of Urbino, Federigo, the command of the Papal troops, and in 1524 was employed by Pope Clement VII to conduct his negotiations with Charles V. When Rome was plundered by the Constable of Bourbon in 1527 he was accused of negligence and his health was undermined by chagrin. He refused to accept the rich bishopric of Avila, which was offered to him by the Emperor, until the Pope should be reconciled with Charles. Among his works, the 'Libro del Cortegiano' is the most celebrated. It teaches the art of succeeding at court. The best edition is by Cian (Florence 1894). His few Italian and Latin poems are elegant. His letters are valuable contributions to political and literary history. (See Il Cortegiano). Consult Cartwright, Julia, 'Baldas-

sare Castiglione: His Life and Times' (New York 1908, trans. by Opdycke, New York 1903).

CASTIGLIONE, Carlo Ottavio, COUNT, Italian scholar: b. Milan 1784; d. Genoa 10 April 1849. His *magnum opus,* published in 1826, is a work in which he seeks to ascertain the origin and the history of the towns in Barbary whose names are found on Arabic coins. Out of Italy, however, he is best known by his edition of some fragments of the Mœso-Gothic translation of the Bible by Ulfilas, which had been discovered in 1817 by Cardinal Mai among the palimpsests of the Ambrosian Library. His biography has been written by Biondelli (Milan 1856).

CASTIGLIONE, Giovanni Benedetto, Italian painter: b. Genoa 1616; d. Mantua 1670. He was a pupil of Paggi and Ferrari, studied at Rome, Florence, Parma and Venice, and formed his style on the best masters. He is particularly celebrated as a painter of animals, and in these subjects, as well as his other paintings, is remarkable for softness, elegance and beauty. Of his larger pieces, the most celebrated are the 'Creation of the Beasts,' 'Their Entrance with Noah into the Ark' and 'Jacob's Return with His Family and Servants, His Flocks and Herds' at the Uffizi, Palazzo Bianco, Genoa, Dresden, Vienna. He also distinguished himself as an engraver, and from his skill in the production of light and shade has been called the second Rembrandt. In 1564 he became court painter to Duke Charles I of Mantua and in that city he lived until his death. Consult Bartsch, 'Le peintre-graveur' (Vol. XIX, p. 71); Hubert et Post, 'Dictionnaire des Graveurs.'

CASTIGLIONE DEL STIVIERE, stēv-yā'rā, Italy, a small city in the province of Mantua, 17 miles southeast of the town of Brescia, 22 miles northwest of Mantua. It is well built, surrounded by walls, defended by an ancient castle and contains a large square adorned with a central fountain, three churches and a town-hall. A well-attended annual fair is held in June. The French obtained here a decisive victory over the Austrians on 5 Aug. 1796, which gave to Marshal Augereau his title of Duc de Castiglione. Its chief industry is silk spinning. Pop. 7,124.

CASTILE, New. See NEW CASTILE.

CASTILHO, kās-tēl'yō, **Antonio Feliciano,** Portuguese poet: b. Lisbon, 26 Jan. 1800; d. 18 June 1875. Though almost blind, he was educated by a brother and studied jurisprudence at Coimbra. His first poetical composition, 'Cartas de Echo a Narciso' (1821), published while he was a student, won him great celebrity. He excelled in pastorals; and to this class belong his 'A primavera' and 'Amor e melancholia.' He had a deep sympathy with nature and was a master of elegiac verse. In prose he wrote a treatise on Portuguese versification and 'Quadros historicos de Portugal' (Lisbon 1838; Rio de Janeiro 1847).

CASTILLA, käs-tēl'ya, **Ramon,** Peruvian soldier and politician: b. Tarapaca, 30 Aug. 1796; d. there, 30 May 1867. He served in the Spanish cavalry until 1821, when General San Martin proclaimed Peruvian independence. Castilla, then a lieutenant, joined the liberating army, in which he distinguished himself. He was appointed prefect of his province. In 1830 he became brigadier-general of the army; and, after the treaty with the President of Bolivia, went to Chile. There, in 1837, he joined the Peruvians in their attack on Santa Cruz, the President of Bolivia. Gamarra was proclaimed President of Peru, with Castilla as Minister of War. In 1841 he was one of the leaders of the Bolivian invasion. He was elected President of Peru in 1845. At the expiration of his term of office, in 1851, he was succeeded by Gen. José Rufino Echénique, but usurped the power in 1855, and was, by a majority of 70,374 votes, re-elected to the presidency in August 1858. He introduced several important reforms, such as the abolition of slavery; and of the tribute paid by the Indians; the granting of universal suffrage; and the prohibition of the practice of all religions save the Roman Catholic. After being succeeded by San Roman in 1862, Castilla lived in retirement till his appointment to the presidency of the Senate in 1865. Consult Markham, 'History of Peru.'

CASTILLEJO, käs-tēl-yā'hō, **Cristóbal de,** Spanish poet, the last representative of the ancient Spanish poetry: b. Ciudad Rodrigo about 1494; d. Vienna, 12 June 1556. He served first as page to the Infanta Fernando, younger brother of Charles V. He took orders and in 1525 became secretary to that prince. The ennobling of his family in 1532 was another mark of royal favor, followed by his appointment in 1536 to the benefice of Perdegge in the bishopric of Passau. This he resigned in 1539 in order to accompany Mendoza, then Ambassador to Venice. He opposed the introduction of Italian styles into the poetry of Spain, and justified his opposition by demonstrating in his own work the competence of the traditional styles of Spain for the expression of all moods and all sentiments. Of his comedies, none are extant. A number of his poems survive, first collected at Madrid 1573. They include love poems, poems of every day life and religious and moral works. Some satires and ballads are also to be found in the collection. Consult Adolfo de Castro, 'Biblioteca de autores españoles' (Vol. XXXII, Madrid 1854): Nicolay, C. L., 'Life and Works of de Castillejo' (Philadelphia 1910).

CASTILLIAN, The. See WASP, REINDEER, AVON and CASTILLIAN.

CASTILLOA ELASTICA, a lofty forest-tree, belonging to the Bread-fruits (*Artocarpaceæ*). Some specimens have near the ground a circumference of from 10 to 12 feet. The tree is native to southern Mexico and the Central American countries and supplies the Central American rubber of commerce. This rubber, instead of being molded, as is Pará rubber, is made into sheets (hence called sheet-rubber) and hung up to dry. *Castilloa elastica* has been found to be cultivable in India and Ceylon.

CASTILLON, käs-tē-yŏn, France, town in the department of Gironde, on the right bank of the Dordogne, 33 miles east of Bordeaux by rail. Beneath its walls, on 17 July 1453, was fought the battle which terminated the Hundred Years' War, when the English met a signal defeat, their leader, Earl Talbot of Shrewsbury, and his son, being slain. Part of the bat-

tle is described in the fourth act of Shakespeare's 'King Henry VI, Part I'. Pop. 3,300.

CASTINE, käs'-tēn, **Vincent,** BARON DE, French soldier: b. Oleron 1650; d. 1722. He went to Canada in 1665, established a mercantile house at Penobscot (now the town and port of entry of Castine, Me.), in 1687, and married the daughter of the Penobscot chief. In 1696 he captured Pemaquid, at the head of 200 Indians. He assisted in the defense of Fort Royal, in 1706, and was there wounded the following year. His son, who succeeded him in command of the Penobscots, was made prisoner and taken to Boston in 1721.

CASTING, the running of melted metal into a mold, so as to produce an object in metal having the shape of the mold. Iron-casting or iron-founding is carried on by three methods, the first called "open sand-casting," the second, "sand-casting between flasks," and the third, "loam-casting." The casting of small articles, as type, is done by machines. See COMPOSING MACHINES. See also FOUNDRY PRACTICE; and FOUNDRY AND FORGE TERMS.

CASTING AWAY OF MRS. LECKS AND MRS. ALESHINE, The, a humorous story by Frank R. Stockton, in which the two delightful old ladies who give their names to the narrative are constantly before the footlights. They set out for Japan, and on the way they are shipwrecked, but escape from the sinking vessel in a leaky boat which finally sinks under them. They make their way to a small coral island with their companion, Mr. Craig, where they take possession of the summer place of the Dusantes and make themselves at home. A missionary and his daughter are added to the party. The two old ladies decide that, as they have come unbidden into the place, everyone should pay for his board so much a week; and the money is put in a ginger jar. They also make up their mind that Mr. Craig should marry the missionary's daughter; and they accomplish their ends in their own inimitable way. Escaping from the island they make their way to San Francisco, after the wedding; and from there they proceed to their home in the East, their sayings and doings on the way being fully as entertaining as those on the island. In a stage coach wreck they meet with the Dusante party and Mr. Dusante attempts to return the "board money" left on the island; and the comedy of the ginger jar enlivens the rest of one of the most characteristic of the Stockton stories.

CASTLE, Egerton, English novelist: b. 12 March 1858. He was educated at Paris, Glasgow and Cambridge universities. After a brief military career he turned to literature and journalism and has written: 'Schools and Masters of Fence' (1884); 'Saviolo,' a play (1893); 'The Light of Scarthey' (1895); 'The Jerningham Letters' (1896); 'The Pride of Jennico' (1898); 'Desperate Remedies,' a play; 'The Bath Comedy' (1899); 'Marshfield the Observer'; 'The House of Romance' (1902); 'The Rose of the World' (1902); 'If Youth but Knew' (1905); 'Flower o' the Orange' (1908); 'The Grit of Life' (1912); 'The Ways of Miss Barbara' (1914); 'The Hope of the House' (1915), etc. The greater number of his later novels have been written jointly with his wife, Agnes Castle.

CASTLE, Vernon, English actor and aviator: b. Norwich, England, 2 May 1887; d. Fort Worth, Tex., 15 Feb. 1918. Vernon Castle Blythe, to give him his real name, was educated for a civil engineer at Birmingham University. He made his professional début in 1907 with Lew Fields, as the Head Waiter in "The Girl Behind the Counter," at Herald Square, New York, and later played minor parts in other productions. But his outstanding talent was dancing and inventing new figures and steps. He opened a dancing school, which proved a most profitable venture, and after his marriage with Irene Foote of New Rochelle in 1911 devoted himself entirely to exhibition dancing and teaching the art. Castle took up aviation in 1915 and received his pilot's certificate from the Aero Club of America in February 1916, and a month later was attached to the British Royal Flying Corps in France. He served at the front for a year, making about 200 flights over the enemy lines. He was killed in an airplane accident while acting as instructor with the Canadian contingent of the flying corps, which had been transferred to Texas for winter training.

CASTLE, William Ernest, American zoologist: b. Alexandria, Ohio, 25 Oct. 1867. He studied at Denison and Harvard universities; became Latin instructor at Ottawa (Kan.) University from 1889 to 1892; in 1895-96 was instructor in vertebrate anatomy at the University of Wisconsin; and in 1896-97 instructor in biology at Knox College. After instructorship at Harvard University, he became there in 1908 professor of zoology. His numerous articles on embryology, animal morphology and heredity appeared in the *Contributions from the Zoological Laboratory of Harvard* and in the *Publications of the Carnegie Institution of Washington.* His published works include 'Heredity in Relation to Evolution and Animal Breeding' (1911); 'Heredity and Eugenics' (1912); 'Reversion in Guinea Pigs and its Explanation,' with C. C. Little (1913).

CASTLE, a word derived from the Latin *castellum,* a diminutive of *castrum,* a fortress or stronghold. The word *castellum* was frequently applied by the Romans as a military term to denote a redoubt. The word has come to be used as the designation of those strongholds which, in feudal times, served at once as residences and as places of defense for the nobles, and which continued to exist until the invention of gunpowder changed the whole system of fortification. The royal residences among the Franks resembled in some points both the Roman villa and the Roman camp, and those of the Frankish nobles differed little from those of the kings except in point of simplicity. Strictly speaking, only the grand feudatories had the right to erect fortified castles, and then only after receiving the royal consent; but the grand feudatories very early began to take it upon themselves to grant the privilege of erecting castles to their vassals, and these again to those of a still lower grade. In this way large numbers of castles began to spring up at an early period in France, Germany, England and elsewhere.

The castles of the Norman Conquest in Eng-

land were probably the first stone buildings erected there. The great square keep of Rochester Castle is probably of this period; it is about 70 feet square, with projecting corner turrets, and as it now stands is 100 feet high, but the battlements have been altered and its original character lost. A heavy wall divides the huge structure into two nearly equal parts, and within this wall a well is arranged which communicates with all three stories; the outer walls are 12 feet thick at the base and the masonry is very perfect. Little is known of the ancient disposition of the minor buildings. There is no doubt that a high and battlemented wall enclosed a court or perhaps two courts, an inner and an outer bail, as they are called; that the keep was enclosed by the inner wall, but always so near the wall that a postern could communicate with the outer moat, and that within the enclosing wall, often built up against its interior face, were stables and storerooms, and also lodgings for the garrison, which last, however, might be temporary structures. This wall was always surrounded by a deep and broad moat, which might be filled with water in a low country, or, when dry, served merely to increase the effective height of the walls and to disarrange the approach of the besiegers. There was always a chapel, but in Rochester Castle this is built against the southeast corner of the keep and opens from its principal floor. In such an early castle the keep is the only very strong place, as a vigorous attack would breach or scale the outer wall very soon.

The castles of the 12th and 13th centuries were far more elaborate, and their tendency was toward separate posts, each defensible by itself. Every tower could be shut up and defended, its little garrison resisting even after the neighboring works had been captured or rendered indefensible. This arrangement had the disadvantage that a very bold and sudden attack might capture the strongest parts of the castle, even the keep itself, before assistance could come to it. The typical castle of the 12th century is the famed Chateau Gaillard in Normandy, and of the 13th century the famous castle at Coucy, near Laon in northern France; and in the British Isles, Kidwelly in Wales, which remains in a perfectly traceable condition.

The perfect castle was not developed until the time when gunpowder was about to make it useless. Thus the Chateau of Pierrefonds, north of Paris, and near Compiègne, was built about 1400, and in this the faults of the earlier castles were avoided. The walls are everywhere of nearly equal height, the galleries of defense are continuous so that the soldiers of the garrison may run easily the whole length of the walls, and these galleries are two or even three deep, allowing the defenders to throw a prodigious rain of projectiles upon any attacking party. These galleries, built of stone, replace the temporary wooden galleries, always put up on the walls of earlier castles when an attack was anticipated. It is to be noted that the attack and defense in mediæval fortifications was vertical; the higher the wall the more formidable was the blow delivered by a falling ball of stone, or a timber or iron bar; while the projectiles from crossbows and military engines would certainly lose nothing, and the garrison in this way was removed far above the assailant, who must come close under the walls to attack. This attack, then, consisted, in the case of a well-defended place, chiefly in breaching or undermining the walls. Escalade was only possible where the garrison was weak or in poor condition or surprised.

Castles often had outer works, thus the barbican or barbacan is strictly a defense built outside of the principal gate and intended to keep the enemy away from it for a certain length of time. When a castle was near a river an outwork would be built on the other bank, covering the bridge leading to the castle. When the site was high, with steep approaches, a covered way might be built to protect the whole of the path leading up to the castle, and the foot of this would have an outwork or strong post capable of some defense.

The introduction of fire-arms and especially of cannon heavy enough to breach the walls compelled a change in the old castles, which were often ruined as consistent pieces of mediæval fortification by having their towers cut down to accommodate artillery of defense. A round stone tower 200 feet high would be cut down to a kind of bastion 30 feet high, with a parapet and embrasures for cannon around its platform. Even this was only temporary, for it was soon found that the effect of artillery fire was irresistible by stone walls, and these were abandoned for the sloping rampart of earth introduced in the 16th century. See FORTIFICATION.

The term castle was applied to the sea-coast forts which defended our modern sea-ports previous to 1870, and of which some still remain. It was held that the stone wall, 8 or 10 feet thick, carefully built of granite blocks, with the embrasures covered by wrought iron plates and allowing of a great accumulation of guns within a small space, were proof against the attack of a fleet; and this because the fire from the decks of ships cannot be so exact as to produce a breach. It was assumed that the enemy would not be able to make a landing near with effective guns. Thus, at the entrance to Savannah, Fort Pulaski was a «sea-coast castle» of that type, but it was breached in a few hours by the rifled guns landed on Tybee Island.

In modern English nomenclature, a name compounded with castle (such as Castle Howard, Berkeley Castle and the like) is used for habitable buildings which may have been erected on the site or immediate grounds of an ancient building of defense or within its old walls; but this is a mere whim in the selection of an arbitrary name. On the other hand, Windsor Castle, the favorite residence of Queen Victoria, has retained much of its mediæval defensive character, but the rooms inhabited by the royal family are of the reign of George IV, and the only part of the ancient work which remains in full use is the great chapel dedicated to Saint George, a famous and beautiful building completed in the time of Henry VII. See CASTLES, HISTORIC.

CASTLE GARDEN, the former immigrant depot in New York, at the point of Manhattan Island, in Battery Park. In the early days of the city the place was a small, fortified island a few feet from the mainland; later it became a public hall for assemblies and

concerts. Here Jenny Lind made her American début. Many years ago the island was incorporated with the general area of the Battery by filling the intervening space with earth and rock; new buildings were erected and the place was devoted to the purpose of landing steerage immigrants. In 1890 it ceased to be used as an immigrant depot and was turned over to the park commissioners of the city of New York. The old fort is now used as a public aquarium.

CASTLE OF OTRANTO, The. Horace Walpole's 'The Castle of Otranto,' published in 1764, owes its importance to the fact that it is the first example of the so-called Gothic romance, a type of fiction which, in the hands of writers like Mrs. Radcliffe, became highly popular in the late 18th century as a reaction against the sentimental and realistic novel of the school of Richardson, and prepared the way for the great exploitation of mediæval romance in the historical novels of Sir Walter Scott. Intrinsically 'The Castle of Otranto' is interesting chiefly by virtue of its absurdity. The scene is a mediæval castle, with frowning battlements, trap doors and intricate subterranean cloisters; the theme, the mysteries which it harbors within its walls. The plot, involving a gloomy tyrant, a persecuted wife, a lovely young prince and two romantic girls, and employing the supernatural crudely at every turn, is not worth rehearsing. A gigantic helmet comes crashing from heaven into the courtyard. An ancestral portrait steps forth from its frame and becomes a ghost. Walpole was a mere dilettante, trying what he could do to wring sensation out of a spurious mediævalism. He is entirely lacking in the delicate skill and the genuine historical sense of Scott. Yet the credit of originality cannot be denied him. He is the father of all those who cast reality to the winds and carry the reader deep into the heart of romantic mystery. 'The Castle of Otranto' was reprinted with a memoir by Scott in 1823; a convenient edition is that in Cassell's National Library. Consult Beers, H. A., 'English Romanticism in the Eighteenth Century' (1898).

JAMES H. HANFORD.

CASTLE PEAK, in Mono County, Cal., one of the highest peaks of the Sierra Nevada, rising to 12,500 feet above the sea, in lat. 38° 10′ N. and long. 119° 30′ W. It is about 25 miles northwest of Mono Lake. The lower slopes are covered with forests.

CASTLE RACKRENT. This story, written in 1800, was the first of Maria Edgeworth's novels and is still regarded by many as her masterpiece. It belongs to that series of novels dealing with Irish life, which elicited the praise of Sir Walter Scott and other contemporaries. The opportunity which Miss Edgeworth had of studying Irish conditions at first hand enabled her in these novels to draw a powerful and substantially accurate picture of contemporary conditions in Ireland. The theme of 'Castle Rackrent' is the wasting fortunes and the final disaster of an honorable Irish family as the result of carelessness, improvidence, folly and absenteeism. The story, of only a few score pages, is told by a faithful old retainer of the family, Thady Quirk, who lives through the successive reigns of Sir Patrick, who drank himself to death; of Sir Murtagh, the close-fisted, who wasted his substance in law-suits; of the dashing Sir Kit, an absentee landlord who married a Jewess whom he despised and confined for seven years in her chamber, and who met his death in a duel; and finally of Sir Condy, under whose easy ways the estate finally passed from the hands of the Rackrents into those of creditors, particularly of Jason Quirk, the son of old Thady, who had bought the debts of the property. The story is told throughout in a vigorous phraseology and is full of local touches of a lively character. Leslie Stephens' article in the 'Dictionary of National Biography' and Helena Zimmern's 'Marie Edgeworth' in the 'Eminent Women Series' may be consulted.

WILLIAM T. BREWSTER.

CASTLEBAR, Ireland, the capital of County Mayo. It is on the Castlebar River, 11 miles northeast of Westport, has infantry and cavalry barracks and some linen manufactures. In 1641 the Parliamentary forces that held the city were massacred after the capitulation by the infuriated besiegers; in 1798 Castlebar was held for a fortnight by the French general, Humbert; and in 1846–47 it suffered greatly from famine. Pop. 3,698.

CASTLEFORD, England, a thriving manufacturing town in the West Riding of Yorkshire, on the Aire, here crossed by a bridge, 10 miles southeast from Leeds. The public buildings include the church of All Saints, several denominational chapels, schools, a market-hall, mechanics' institute, etc. There are numerous collieries in the neighborhood; and the town has extensive manufactures of glass bottles, earthenware and chemicals. Pop. 23,090.

CASTLEMAINE, Australia, a municipal town in the colony of Victoria, in the county of Talbot, at the junction of Barker and Forrest creeks, 78 miles northwest of Melbourne, on the Melbourne & Echuca Railroad. The town is pleasantly situated and well laid out, and the buildings, both public and private, are of a superior character. Castlemaine owes its importance to the mining industry carried on in its neighborhood, and it has a reputation as a resort for persons suffering from pulmonary complaints. Pop. 5,228, exclusive of aboriginals.

CASTLEMON, Harry. See FOSDICK, CHARLES AUSTIN.

CASTLEREAGH, kās'ĕl-rā, **Robert Stewart,** VISCOUNT, English statesman: b. 18 June 1769; d. 12 Aug. 1822. He was educated at Armagh and at Saint John's College, Cambridge. He entered the Irish Parliament in 1790, became Viscount Castlereagh (1796). He turned Tory in 1795 and next year became keeper of the privy seal, but he continued a steadfast supporter of Catholic emancipation. Still, he believed that emancipation with an independent Irish Parliament would mean simply a transference of tyranny from the Protestant oligarchy to a Catholic democracy; hence, as chief secretary from 1797, he bent his whole energies to forwarding Pitt's measure of union. Transferred by the union from Dublin to Westminster, he accepted office in the Addington ministry (1802), as president of the

board of control; but the true second era in his career was as War Minister under Pitt from July 1805 to January 1806, and again under Portland from April 1807 to September 1809. His real greatness begins with March 1812, when, as Foreign Secretary under Lord Liverpool, he became the soul of the coalition against Napoleon, which, during the momentous campaigns of 1813–14, was kept together by him, and by him alone. He represented England at the congresses of Chatillon and Vienna in 1814–15, at the Treaty of Paris in 1815, at the Congress of Aix-la-Chapelle in 1818. As the leader of the Liverpool government in the lower house, he carried the suspension of the Habeas Corpus Act in 1817. The "Six Acts" of 1819 made him extremely unpopular. The retirement of Canning from the ministry (1820) threw the whole weight of business on Castlereagh. By the death of his father in 1821 he became Marquis of Londonderry. He was preparing to start for a congress at Verona, when, in a fit of insanity, he committed suicide with a pen-knife at Foots Cray, his Kentish seat. Consult his 'Memoirs and Correspondence' (12 vols., London 1848–53) and Hassall, Arthur, 'Viscount Castlereagh' (ib. 1908).

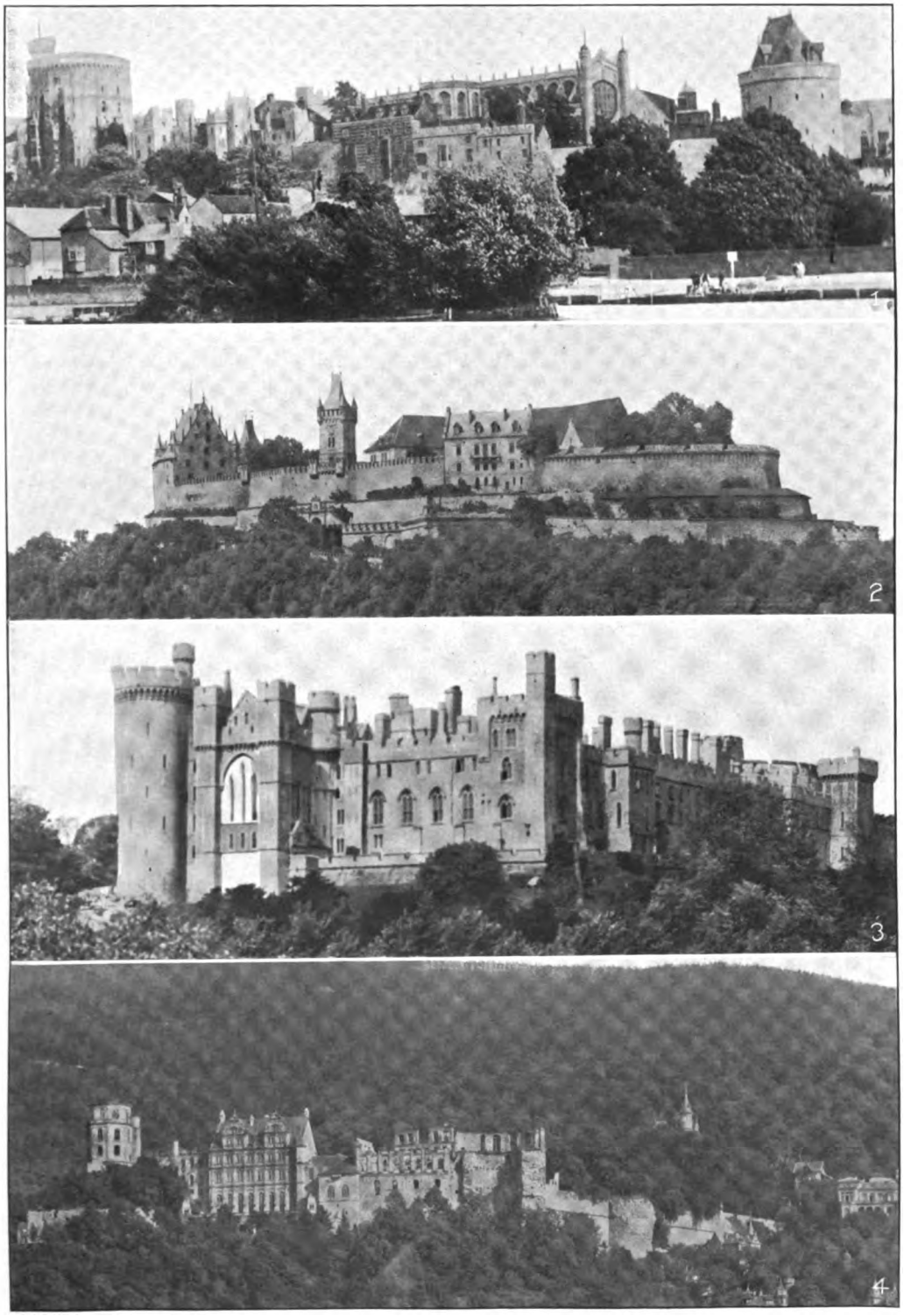
CASTLEREAGH, Ireland, a market-town of Roscommon County; also a barony in the county of Down. The castle stands on the summit of a Danish rath and was once the seat of an O'Neil. It is now the property of the Marquis of Downshire. The barony gives the title of viscount to the Marquis of Londonderry.

CASTLES, Historic. Of castles and ruins of castles to be found to-day, perhaps the most interesting are those of Germany. These "Burgen," whether of the feudal lords or of the "Robber Knights," on account of their rugged situation, protected by mountain fastness, forests and rivers, were peculiarly adapted to the feudal period, and their remains stand as representative of the best of that time. And nowhere else has greater effort been made to preserve these relics of the Middle Ages, or to keep alive the history and romance with which they have been identified. The district having the greatest number of especial interest is that along the Rhine, from Coblenz to Bingen, where in the course of a five-hour trip by steamer 20 or more castles may be seen; however, below Coblenz are a few notable castles, for instance, near Königswinter stands above the mountainous terrace the ancient and famous castle of Drachenfels, or "dragon's rock" (so called in reference to the dragon slain by Siegfried). It was erected by Arnold, archbishop of Cologne, in 1147 and bestowed by him as a fief on the Cassins Monastery at Bonn in 1149. The keep is one of the rare examples of pure ashlar work in the district of the Rhine. From 1176 on the castle was in the hands of the Burggraves of Drachenfels, whose race became extinct in 1530. The red wine grown on the southwest slope is known as "Drachenblut" or dragon's blood. The castle of Ehrenbreitstein at the junction of the Moselle and the Rhine, just opposite the city of Coblenz, was an ancient stronghold of the Electors of Treves (Coblenz). It played an important part in the Thirty Years' War; it was taken by the French in 1799 after a gallant resistance. Since 1826 it has been a fortress.

One of the most imposing is the Castle of Stolzenfels — "The Proud Rock" — near the village of Capellen. Built in 1250 by Arnold, archbishop of Treves, destroyed by the French in 1688, it remained in ruins until 1823, when the city of Coblenz purchased and presented it to the Prince Royal Frederick William IV, who at an expenditure of a quarter million dollars restored and furnished it (1836–42). While greatly modernized, the original pentagonal tower, 110 feet high, has been retained. Also on the Rhine near the village of Oberlahnstein is the Castle of Lahneck, with its pentagonal tower, of the 12th century. Destroyed by the French in 1688, it was restored during the last century. It is noted in literature as being the inspiration of Goethe's 'Geistes-Gruss' (1774). Commanding Braubach is the Castle of Marksburg, 490 feet above the river. It is the only ancient fortress on the Rhine that has escaped destruction. Built in 1437, it received its name from its chapel dedicated to Saint Mark; from 1479 to 1803 it belonged to Hesse-Darmstadt, in the latter year being turned into a state prison. Since 1900 it has been in the possession of the Society for the Preservation of German Castles, which has had it restored in 15th century style. Near the town of Saint Goar are the ruins of the Castle of Rheinfels, the most imposing and extensive on the Rhine. It was built in 1245 by Count Diether III of Katzenbogen, for the purpose of forcing payment of tribute for the right of navigating the river. The exactions of this robber knight becoming onerous, the neighboring inhabitants rebelled and for 15 months besieged the castle in vain. The siege being raised, a league was formed to relieve navigators of the river from such tolls, as a result of which many of the Rhine castles were destroyed. Near Saint Goarshausen is the Castle of Reichenberg, built by Count Wilhelm I (1284), of Katzenbogen, rebuilt in 1319 and subsequently the residence of the governors during the Hessian supremacy.

For romantic interest the Castle of Schönburg is especially notable. Erected in the 12th century near the town of Oberwesel, it stands proudly to-day with its four towers. It was the birthplace of Frederick Hermann of Schönburg, who, as Marshal Schönburg, was killed at the battle of the Boyne in the wars of William, Prince of Orange, against his father-in-law, James II of England. Innumerable legends cluster about the castle, the best-known being of the seven beautiful daughters of one of the Counts of Schönburg, who through their coquetry caused such havoc with their admirers that the Lorelei, the river fairy, to punish them, drowned the seven and turned them into rocks, which rocks are to-day pointed out by the boatmen during low water. Another is the Castle of Gutenfels, one of the most ancient on the Rhine. Built by the Knights of Falkenstein, it was sold, along with the little town of Caub, to the Palatinate in 1277. Its lofty, square-pinnacled tower still stands as originally built. Recently the castle has been restored. The Pfalz, near Caub, is a splendid example of the 14th century castle, being well preserved within and without. It has a pentagonal tower — a favorite form among the Rhine

CASTLES



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1 Windsor Castle, England
2 Castle at Coburg, Germany
3 Arundel Castle
4 Castle Heidelberg, Germany

castles — and numerous turrets and jutting corners, loopholes and one entrance only, a door situated six feet above the rock and reached by a ladder. It was built on a ledge of rock in the middle of the Rhine by Louis the Bavarian for the purpose of exacting tolls from passing boatmen.

The Castle of Stahleck (12th century), near the town of Bacharach, was formerly the residence of the Counts Palatine. Taken and retaken eight times during the Thirty Years' War, it was finally destroyed by the French in 1689, but its picturesque ruins are of great interest to travelers. Near it are the ruins of the Castle of Nollich, 580 feet above the Rhine, the subject of many a legend. Near the village of Rheindiebach is the Castle of Fürstenburg, also in ruins. It was here that in 1292, when Adolph of Nassau was on his way to be crowned at Aix-la-Chapelle, the garrison of the castle detained his vessel for the purpose of levying toll. It was destroyed by the French in 1689. The massive tower of the Castle of Heimburg (13th century), near Niederheimbach; the Castle of Nollich, near Lorch; and Sooneck (A.D. 1010), with its slender tower, are interesting, as well as the Falkenburg — stronghold of the "robber knights," and for this reason destroyed in 1252 by the Rhine League, but later restored and again destroyed in 1689.

An example of a castle entirely surrounded by water is the Mouse Tower, near Bingen, in the middle of the river. It was built in the 13th century by Archbishop Siegfried as a toll-house. It fell into ruins, was restored in 1856 and is now used as a signal station. The Castle of Klopp, at Bingen, stands upon the site of a former Roman fortification. It has been restored and is now the municipal seat of Bingen, and in it are preserved many of the antiquities of the Roman and Mediæval periods. It was at this castle that Emperor Henry IV was seized by his treacherous son — afterward Henry V — on Christmas Day, 1105. Other castles of interest are Ehrenfels (ruined) and Rheinstein, the latter one of the oldest castles on the Rhine. In 1825 it was purchased by Prince Frederick of Prussia and has since been carefully restored, even to the interior furnishings. Its collection of mediæval armor is notable.

The Schloss Saarsbrücken is a splendid example of the feudal castle, having all the appurtenances of mediæval times. Located on the river Saar, the castle was until 1793 the residence of the family of Nassau-Saarbrücken, when it was destroyed by the French. Later it was restored in part and was used as a nunnery. While it is strongly fortified, many of the buildings are devoted to residential purposes. Being situated upon a height, its natural location is defensive. Its walls, with their towers and upper corridor, portholes, etc., are built for repelling attack from any quarter, and within is sufficient space to accommodate a large number of retainers or a garrison, with living accommodations superior to the ordinary castle. The court is divided into two wards, in addition to the divided garden plot, the last a later development. The donjon is the towering structure at the upper corner, overlooking the valley and inaccessible from the outside. In addition the wall is plentifully supplied with watch and defensive towers. The lack of a moat is explained by the fact that the ground surrounding the castle slopes away in every direction. Another fine example of the mediæval castle of the "robber knights" is Castle Wildenstein. Its location on a high cliff overlooking the Danube River is an ideal one for protection against sudden attack. Such locations were usual for the castles of the free-booters of the Middle Ages. The stone tower in the centre was connected by bridges that could be lifted or destroyed with the two castles on the cliff, and in case of siege, the knight and vassals, taking refuge in the one on the isolated cliff, were able indefinitely to withstand attack.

Other notable German castles are those of lower Bavaria planned and constructed by Ludwig II, the Mad King. They are the castles of Neu-Schwanstein, Hohen-Schwangau, Linderhof and Herrenschiemsee. The Neu-Schwanstein is modern, its construction being begun in 1869 on the site of the old castle, Vonder-Hohen-Schwangau, on a precipitous rock. Its style is Romanesque, and the greatest German architects of the day — Hoffmann, Riedel and Von Dollmann — are responsible for its completion. Its fittings, while modernized, are connected with the past, particularly in the mythological subjects known to us from Richard Wagner's operas, and events in the history and life of Louis XIV, King Ludwig being particularly proud of both. Its tower rises to a height of 195 feet, from which there is to be had a splendid view of the Pöllat River with its gorge and waterfall and the surrounding country. Schloss Hohen-Schwangau (12th century), formerly called Schwanstein, was originally the seat of the house of Guelph; in 1191 it came into possession of the Hohenstaufen Dukes of Swabia, and in 1567 passed to the Dukes of Bavaria. Fallen into ruins, it was purchased in 1832 by King Max II of Bavaria, who restored it, decorating the interior with frescoes depicting German legends. Later, King Ludwig made additions. Schloss Linderhof, erected by King Ludwig II (1869–78) in the rococo style, is notable for its unique furnishings and garden, particularly its grotto with a subterranean lake and swan-drawn boat, Moorish kiosque and the cascades. Schloss Herrenschiemsee (1878–85), near the ancient castle of the same name, is another of King Ludwig's creations, and in it also the motive is Louis XIV and Wagner. The decorations are sumptuous and many of the halls are notable. The Gallery of Mirrors, 245 feet long, is lighted with 35 lustres and 2,500 candles. One of the most novel features, however, is its dining-hall with its table ascending and descending, so that no servant need be in the room.

Other notable German castles are Heidelberg, an interesting ruin with rich decorations, the statue of Charlemagne and other sovereigns in particular. Built in the 12th century, it has been added to and improved at various times since, and in it are the remains of the best examples of the different styles of architecture through which it has passed. Destroyed by the French (1689), it has since remained a ruin, but perhaps one of the most picturesque to be found anywhere. The Heidelberg Tun, the castle cellar, is notable for its 800 hogsheads of wine, and its general mediæval ap-

pearance. At Nuremberg are two famous castles — Burgrafsburg and Kaiserburg, both of the 11th century. The former is the oldest building in the town. Its only remains is the Pentagonal Tower, wherein are kept relics of the antiquity of the city and castle. Its moat is still to be seen, as likewise its well, 338 feet deep. Kaiserburg, or the Imperial Castle, was formerly the residence of Frederick Barbarossa, who enlarged it. It has been added to from time to time, and is to-day in a state of splendid preservation, being greatly modernized during the last century. Its furnishings and decorations are magnificent, and at the same time representative of the age of the castle.

A famous castle in Alsace is the Hoh-Königsburg; it is built upon a ridge mentioned in a document of 774 as the "Stophanberch" (Staufenberg); was in the possession of the Hohenstaufen family about 1147 and was later held in fee by the Counts of Werd. In 1462 it was destroyed by the League of Rhenish Towns, but in 1479 it was rebuilt by the Counts of Thierstein. From 1533 to 1606 it was held in pledge by the Lords of Sickingen, from whom it passed successively into the hands of the Lords of Bollweiler and the Counts Fugger (1617). In the Thirty Years' War the castle was destroyed by the Swedes (1633). Toward the end of the 17th century it fell again into the hands of the Lords of Sickingen, who sold it in 1770. After various other changes of ownership it was acquired in 1865 by the town of Schlettstadt, which presented it to Emperor William II in 1899. The Emperor caused it to be rebuilt (1901–08) at the expense of Alsace and the German empire from the plans of Bodo Ebbhardt, who restored it as far as possible to its appearance in the 15th century. Its huge walls and towers of red sandstone, towering above the dark-green chestnut wood, are strikingly picturesque.

Beyond Colmar (Alsace) above the village Egisheim stands the castle of Hohen-Egisheim or Dreien-Egisheim, with its three towers, viz., the Wahlenburg and Wekmund of the 11th century and Dagsburg of the 12th century, together known as the "Drei-Exen." In Egisheim itself is the recently restored palace "Pfalz" that is said to date back to the 8th century.

Near Strassburg is the ancient Imperial fortress Trifels. It was founded as early as the 10th century, but the present scanty ruins date from about the middle of the 12th century. Trifels was not infrequently occupied by the German emperors. Its walls protected the unhappy Henry IV, when excommunicated by Pope Gregory VII in 1076 and deserted by his nobles. It was here that Richard Cœur-de-Lion is said to have been confined for more than a year (1193–94) by the Emperor Henry VI, until his liberation was effected by the faithful Blondel. After the Thirty Years' War the castle fell to decay. The central tower, 33 feet in height, and the chapel have recently been restored. In cleaning the castle-well, the spring, cut in the rock, was discovered at a depth of 270 feet.

The Castle of Coburg (16th century) is a late-Gothic structure used as a fortress and later as an arsenal. At present it is a museum. Its collections of arms and armor, woodcuts (200,000), paintings relating to German history and natural history are notable. It was here that Martin Luther resided for a time (1530) and translated the Prophets and Psalms. In connection with Luther, the picturesque Castle of Wartburg (12th century) at Eisenbach is of interest. This castle was the centre of German letters and art for many generations, and in early days it was the scene of contests in minstrelsy for all Germany. Here Luther sought asylum and found refuge when he translated the greater part of the Bible. At Munich is the Schloss, a large group of buildings (1663–1728). It is in reality a palace, with beautiful grounds, conservatories, cascades, etc., and its decorations are of the best of the rococo period. It is the residence of the king, and its fittings are in regal magnificence; as an instance, the curtains of the Bedchamber are of gold brocade valued at $400,000. Here also is the "Schatzkammer," or Treasure Chamber, containing the crown jewels and other priceless objects of historic interest.

At Würzburg is the old Castle of Marienberg (12th century), formerly the residence of the prince-bishops. It is a magnificent structure containing 285 apartments. Besides its Echter-Tor (1606) and Neu-Tor (1657), it has another tower, the "Alarm-Batterie" commanding the city. Especially notable is its chapel, richly decorated in the florid style of Louis XIV. A later Schloss, or Royal Palace, built 1720–44, is one of the finest specimens of 18th century construction to be found, an example of the baroque style from designs by Neumann. Its size is 550 by 290 feet, and it contains 312 rooms, a chapel and a theatre, all uniformly decorated in keeping with the general purpose of the structure. In connection with the palace is an orangery of great beauty. At Schwerin, the Palace (1845–57) has been built on the site of a 12th century castle of the Princes of Mecklenburg, parts of the original structure, as rebuilt in the 15th and 16th century, being incorporated into the present building. It is an extensive structure with lofty towers, enclosing a pentagonal court. Of its rooms, the Waffenhalle, Thronsalle and Gothic Chapel (1560–63) are especially notable.

At Dresden there is a famous castle, the Royal Palace, founded in 1530, and enlarged early in the 18th century, with extensive alterations during recent years. Its Grünes Tor is the highest structure in Dresden (331 feet). The original staircase, towers at the four corners and the gallery over the gate (1549–51) still stand. The Palace is a veritable museum of the history of art, particularly of the art of Dresden, famous as the centre of the porcelain industry, and the Green Vault, on the ground floor, contains one of the richest collections of the goldsmith's and other handicraft of the Renaissance and later periods.

In Berlin, the Schloss, or residence of the Kaiser, is representative of the mediæval castle changed into a palace. The original Schloss was built by the Great Elector Frederick II (1443–51), was altered (1698–1716) and enlarged until to-day it is 650 feet in length by 380 in width. In the reign of Wilhelm II it became the residence of the reigning sovereign. Its decorations and appointments are in keeping with the purpose for which it is used. It

represents the work of two of Germany's greatest architects, Schlüter and von Goethe. The western part is an imitation of the triumphal arch of Septimius Severus at Rome. Other royal residences at Berlin are the Palace of the Crown Prince, the Palace of Emperor Wilhelm I, the Palace of Prince Frederick Henry of Prussia, that of Prince Frederick Leopold, erected 1737, and the Palace of the Princesses, connected with that of the Crown Prince by an arch over Oberwall-Strasse.

At Potsdam, "the Versailles of Prussia," is the Palace of "Sans-Souci," erected by Knobelsdorff in 1745–47 for Frederick the Great. It is copied after the Palace of Versailles. It was here that Frederick the Great spent the greater part of his life, the rooms and objects connected with his history remaining as he left them. In addition, Frederick built a New Palace (1763–69), a magnificent building with 200 rooms, now the summer residence of the Kaiser.

Wherever one goes in Germany, he finds evidences of mediæval life in the castles that served their day, are now ruins or intact as fortifications or adapted to residential or museum and civic purposes. With few exceptions, the public is admitted at stated times to these relics of the past, sometimes free, but generally for a small fee used for their upkeep.

In France, feudalism took deep root, and everywhere is evidence of its existence in the castles or their ruins to be found in every city and hamlet. Even later, when kingcraft had subdued the barons, these castles became fortresses in the civil and religious wars that disturbed the country for three centuries, and later yet when the Crown of England was attempting to keep its hold on Normandy and France, and quarter was a thing unasked for.

As to their form, the castles of France were very similar to those of Germany, with the exception that, save in exceptional instances, the territory to be protected by them was without the natural fastnesses and barriers of the territory adjacent to the German castles. Architecturally they show more of the Roman and Byzantine influence. What is reputed to have been the greatest example of the mediæval castle was the Castle of Coucy (1230–42) built by the Seigneurs of Coucy, near Soissons. Guarding the castle and covering an area of more than 10,000 square yards, the donjon towered 210 feet above its walls, at the base being 34 feet thick. This castle was destroyed in 1916 by Germany in the European War. Second to it in France is the Castle of Vincennes, in the park of the same name, just outside the fortifications of Paris. Built originally in 1137 by Louis le Jeune, it was demolished by Philippe de Valois in 1333, and the present foundations were laid. It was built in a rectangle, 1,200 by 672 feet, and flanked by nine square towers. It contained a donjon, a citadel and a prison, notable for the prisoners that it has held — Mazarin, Diderot, Mirabeau, Henri IV, the Princes of Condé, Cardinal de Retz and others equally famous. In 1784, after the publication of Mirabeau's "Essai sur les lettres de cachet," it ceased to be a state prison, and fell into decay after the Revolution. In 1818, most of its old towers were torn down and the castle was turned into an arsenal. At present it is a fortification. The buttressed entrance tower and the donjon, repaired in part, still stand intact, the latter 115 feet high. The donjon is isolated from the rest of the castle wall, with which it is connected by drawbridges over a deep moat. It is in the middle of the court, has four towers, and stands four stories above ground, access from floor to floor being by spiral stairways in each of the towers. Its architecture is Gothic, the large central room (30 feet square) on each floor being vaulted, with a supporting column in the centre. Its walls are 17 feet in thickness.

Northwest of Paris, near Les Andelys, are the ruins of the Chateau Gaillard, built by Richard Cœur-de-Lion, and finished in one year. On a high cliff overlooking the Seine, it was erected to control the navigation of this river and to protect Normandy against the French monarchs. It was considered impregnable to military attack, but after a siege of six months by Philip Augustus starvation forced its defenders to capitulate. Lest it fall into the hands of a too powerful enemy, Henri IV in 1603 destroyed it with several other castles belonging to Norman barons. For its total demolition, however, 16 years were required, and even to-day its ruins appear formidable from the Seine. It is famous in art from a painting made by Turner. At Dieppe stands the Tour de Jeanne d'Arc, the remaining relic of the citadel in which the Maid of Orleans was tried and condemned. It was erected by Philip Augustus in 1204. The tower in which Jeanne d'Arc was imprisoned was demolished in 1809. At Dieppe also are ruins of two other castles, one the "Castle," occupying a commanding position on a precipitous cliff overlooking the sea, erected in 1433 as a defense against the English. Sixty-four years later it, with the entire town, was destroyed by the bombardment of the English fleet. The other is the Castle of Arques, famous as the scene of victory of Henri IV over the League in 1589. The Castle of Gaillon, erected in 1500 and destroyed during the Revolution, stands in the town of the same name, its partly destroyed ruins now used as a prison. In its day it was considered as one of the finest in Normandy, its architecture being of such excellence that the lofty façade has been removed and is now in the court of the Ecole des Beaux-Arts at Paris. This castle was erected by Pierre Fain, one of the greatest architects of the 15th century, for the Cardinal d'Amboise, Minister of Louis XII, and a patron of the Renaissance in France, and is of mixed Gothic and Renaissance style.

At Provins stands the ruin of an ancient castle whose erection dates back to the conquest of Gaul. It is known as the Grosse Tour de César. While reputed to be of Roman origin, it has many evidences of origin in the Middle Ages. Its massive tower is square at the base, but as it rises it separates into four turrets, and the base at the height where they begin becomes octagonal. The turrets are connected by flying buttresses. This donjon, as such it originally was, has two curious rooms or dungeons evidently used for the confinement of military and state prisoners. The structure now serves as the bell tower of the neighboring church of Saint Quiriace, likewise a relic of the Middle Ages. Off the coast of Normandy

the Castle of Mont Saint Michel (q.v.) is a picturesque example of the mediæval stronghold. Situated on a lofty rock and surrounded entirely by water at high tide, it was almost impregnable, except for the fact that it had no fresh water, which itself was responsible for its surrender by its defender, Henry, to his brothers, William the Conqueror and Robert, in the year 1091.

Around the city of Paris are many famous castles, some in ruins, but the greater number restored or altered, as residences, museums, or municipal and state buildings. To the east on the Marne is the Chateau Thierry; to the northeast the Chateau de Villers Cotterets, with gabled roof and towers, situated in the beautiful forest of the same name; the Chateau de Pierrefonds, a perfect example of the feudal stronghold, at one extreme of the Forest of Compiègne, while another is the Chateau de Compiègne, modern, now a museum; the Vieux Chateau de la Ferté, in ruins, with its five towers and gate still standing. Near Nanteuille-Haudouin is the old ruin Nantouillet sur les Fosses, and in the Forest of Ermenonville is the Chateau of the same name, Ermenonville, a square and a round tower with part of the wall yet remaining. To the north is the Chateau de Chantilly, a palace, and the Chateau de Mouchy. To the northwest is the ruin of the Chateau de Gisors, a famous castle during the wars between France and Normandy, and near the city of Paris the Chateau or Palace of Saint Germain, residence of the kings of France. To the west, the Chateau d'Anet, the portal of which, due to its chaste design, is preserved in the court of the Ecole des Beaux-Arts at Paris; and the "Donjon," the massive remains of a mediæval castle at Houdan, near which, at Boutigny, is *La Vieille Porte féodale*, the gateway to another castle of the same age. At Montfort is the Porte Bardou, a fragment of mediæval fortification, and in the Forest of Rambouillet, southwest of Paris, is the donjon of the original Chateau de Rambouillet, with later additions, south of which is the Chateau de Maintenon, a palace, and further to the south, near Auneau, a single corner of an old castle known as "Épaule de Gallardon." Likewise, to the southwest of Paris is the Chateau de Versailles, now a state museum, the magnificent palace of French royalty, and the scene of many of the most notable events in French history, particularly the Revolution. (See article on PARKS). To the south of Versailles is the mediæval Chateau de la Madeleine, with donjon and a few other parts intact. South of Paris is the Chateau and Tour de Montlhéry, in ruins, and to the southeast, the famous chateau and Forests of Fontainebleau, noted as the country residence of French royalty, and one of the showplaces of France to-day.

In Italy, with the exception of the northern part, the feudal system did not have the hold that it had in western Europe, and such castles as it possessed were rather of the paternal or family type, and the castles to be found differ likewise from those here described. Such seats as were depended on for protection were usually the palaces of former Roman governors, built with a view to guard against the depredations of the Goths, Huns and Vandals from the north.

Spain in many ways is looked upon, particularly for romantic reasons, as the country of castles. "Castles in Spain" bring to the imagination feudalism and chivalry. Castile, one of the most important provinces, means "castle," and throughout its whole extent are numberless ruins of Moorish and Gothic feudal fortifications. The Spanish castle differs appreciably from those of the northern countries, in that it was an appendage of the religious wars that were waged for centuries between Moor and Christian, and wherever a castle is found, there also is a cathedral or chapel or mosque. The Arab word for castle — Alcazar or Alcazaba — is found throughout the Iberian Peninsula, often as the denomination of the most important of the Moorish remains. The Alhambra, in part, was a castle, and here the Chalifs of Granada fortified themselves and founded a civilization of which the remains, yet visible, are a credit to Oriental culture. At Cordoba is the Alcazar, a famous sight to-day, and at Gibraltar, in the year 725 A.D., the Moors had a castle, the remains of which are still to be seen. The Alcazar of Alfonso the Learned, at Segovia, is a striking example of the combination of Moorish and Gothic architecture, a structure buttressed and turretted, with a square donjon in the centre, which was also buttressed and turretted, like a citadel. The city of Burgos, Spain, takes its name from the word "Burg," it being erected by the "German son-in-law" of Diego Porcilos, in the 9th century.

In the British Isles there are evidences of castles or rude fortifications dating from the days of the Roman conquest. It is, however, from the days of William the Conqueror that the castle as we know it took its rise, as this monarch, familiar with feudal and state fortifications on the Continent, found such of the greatest utility in maintaining Norman supremacy over the English barons. As to the architecture of British castles, they combined all styles used on the Continent with a purely English form that differentiates them from others. But the principles of fortification were the same.

On the eastern limits of the town of Dover there stands to-day the Castle, the modern fortification standing on the site of the original Dover Castle, the "Key to England." The remains of the original, altered by the vicissitudes of time and civil and foreign wars, have been incorporated in the present fortress. Within sight of Calais, the nearest and most formidable foreign enemy, it was constructed on a hill 320 feet high, and was fitted to withstand long sieges, the necessity for which was frequently proved. At York, one of the most ancient cities in the kingdom, and the reputed birthplace of the Emperor Constantine, there are many relics of the Roman occupation of England, the most interesting being the Multangular Tower. This tower is 30 feet in diameter in the interior, and was originally of a 13-sided form, 10 of the 13 walls still remaining. Of the remains of the Middle Ages, the castle still stands, and within its walls are at present the law courts and jail. The donjon, known as Clifford's Tower, is intact. Of other remains of the feudal days are portions of the ancient walls, beyond which the city has extended. The gates, known as "bars," are an interesting feature found in many English

cities. They are usually towered and embattled, with portholes, and locations on the streets that they cross are usually spoken of as below or above the bar. Other castles are found in the neighborhood of York, among them being Pontefract Castle, where Richard II was murdered, and Conisborough Castle, near Doncaster. At Durham is the ancient Norman Castle founded by William the Conqueror, and now in possession of the university.

Near Newcastle-on-Tyne is Alnwick Castle (11th century), occupied continuously from the 14th century by the Percy family. Formerly an important border fortress, it is noted in England as being one of the finest examples of feudal dwellings in the kingdom, and with modern restorations it is in a perfect state of preservation. It covers five acres of ground. Malcolm, King of Scotland, and his son, Prince Edward, were killed here in 1094, and in 1174, while besieging the castle, William the Lion was taken prisoner. Near Alnwick Castle is the ruin of Warkworth Castle, and a few miles away on the sea shore is the recently restored Bamborough Castle, standing on a rock 150 feet high. It was a Saxon fortress, built in the 7th century. Near it is the ruined Castle of Lindisfarne, referred to by Sir Walter Scott in 'Marmion.'

At Rochester on the river Medway is the ruins of one of the finest castles in England. The walls and the donjon are in almost perfect condition. At the town of Newport is the ruins of Carisbrook Castle, the donjon of which is supposed to have been a Saxon stronghold. The tower, ivy covered, reaches high above the rest of the structure. The outer walls of the castle enclosed about 20 acres. The ancient well, 240 feet deep, is still in use. It was here that Charles I was a prisoner in 1647. At Kenilworth is a noted castle, made famous by Sir Walter Scott. The ruins are extensive and picturesque. It was the stronghold of Simon de Montfort, Earl of Leicester, and the insurgent barons during the reign of Henry III, and was likewise the abode of Robert Dudley, the favorite of Queen Elizabeth. Its donjon is known as Cæsar's Tower, and is the most ancient portion of the castle. Its walls in places are 16 feet thick. The remains of the banquet hall, 86 by 45 feet, are still to be seen. Near the borough of Grantham is Belvoir Castle, the magnificent manor house of the Duke of Rutland, with one of the best collections of paintings in the kingdom, and furnishings of ducal splendor. At Rochester is the remains of a castle notable in English history, the keep still standing, 104 feet high. At Norwich is a castle architecturally known for its ornately designed arches. The castle in which Edward II was murdered is still seen at Berkeley, occupied by the descendants of the family that then possessed it.

Of all the castles in England none is better known than that of Windsor, typical in its magnificence of the feudal stronghold, and today the residence of the royal family. On a height overlooking the Thames, it commands a great stretch of territory. It has 13 towers, and within its walls are two rectangular wards, the lower and upper. The keep is in the centre. It has many sumptuously decorated and furnished halls and rooms, in keeping with its regal uses, and one octagon room, 38 feet in diameter. It is surrounded by a large park. Historically, however, no English castle is better known than the Tower of London. Erected on the site of a Roman fortress, the Tower as it exists to-day was originated by William the Conqueror (1078). At first a stronghold and palace, it is best known as a prison. It is at present a fortress, a museum, and depository of the Crown jewels. It overlooks the Thames, a moat being between the river and the castle. The most conspicuous part is the White Tower, or donjon, in the centre, having four entrances, the Iron, Water, Traitor's and Lion's Gates, the last the principal one. Other towers are the Bell Tower and Bloody Tower. The walls of the towers are from 13 to 15 feet in thickness, and are surmounted by turrets at the angles. The chapel is considered one of the finest examples of Norman architecture in the kingdom. In the inner ward are 12 smaller towers, all of which have been used as prisons, mostly for state prisoners, among whom were Queen Mary, Princess Elizabeth, Sir Walter Raleigh, Lord Dudley, Henry VI and the Earl of Warwick.

Wales, Ireland and Scotland, likewise, have their castles, resembling those of England, with the exception that they were clan strongholds rather than feudal residences. Near Cardiff, Wales, are the remains of four famous castles — Caerphilly, Neath, Swansea and Oystermouth. Of these, Caerphilly in size and grandeur — judging from its ruins — is the greatest of all. In Ireland, the most famous to-day is Blarney Castle, near the city of Cork. It is now a picturesque ruin. It was erected in 1449 by Cormac M'Carthy. Its chief feature is its embattled square tower. It is visited by thousands of tourists on account of its world-renowned "Blarney Stone," a small stone on the highest point of its northern turret, which is supposed to give those that kiss it the power of fluent and witty speech. In Scotland, the best known is Edinburgh Castle, the immense fortress overlooking the city of Edinburgh. The fortress as it stands to-day is on the spot of an ancient castle erected before the first records of Scottish history. It has one entrance, across a drawbridge through a portcullis, above which is the old state prison. Within is a Norman chapel built by Queen Margaret (11th century), and restored in 1853. The castle was formerly a palace of the Scottish kings, but to-day is an object of antiquarian interest, aside from its military uses. Among the relics in its collections is "Mons Meg," one of the earliest examples of cannon, cannon such as were used to batter down the castles of the feudal barons. It is 13 feet long, 20 inches in diameter, and weighs five tons. It is formed of long strips of iron, held together by hoops. Of as much interest, but less known, is the Castle Dunie, the seat of Lord Lovat, perhaps the last example of a castle being used for feudal purposes. In 1740 mediæval service was still required of the retainers of this eccentric Lord, who lived in one room, her Ladyship in another and the servants — of whom there were many — below in a covered court with straw for beds. (See also CASTLE). Consult Piper, Otto, 'Burgenkunde' (Munich 1895); Eberhardt, Bodo, 'Deutsche Burgen' (Berlin 1908); Clark, 'Medieval Military Architecture' (Lon-

don 1884); Larned, 'Churches and Castles of Medieval France' (New York 1895).

FRANK KOESTER,
Author of 'Modern City Planning and Maintenance.'

CASTLETON, England, a village in the County of Derby, 10 miles northeast of Buxton, situated at the bottom of a rugged eminence, on which stands the ancient castle called Peak Castle, erected by William Peveril, natural son of the Conqueror. The houses are chiefly of stone. It contains the parish church of Saint Edmund, a fine specimen of the early pointed style and the vestry of which contains a valuable library. The inhabitants are mostly employed in mining; but many derive a subsistence from the manufacture of ornamental articles from spar. The Castle of the Peak is celebrated in Scott's novel, 'Peveril of the Peak.' Pop. 581.

CASTLETOWN, Great Britain, a seaport and former capital of the Isle of Man, on Castletown Bay, 10 miles southwest of Douglas. Castle Rushen, now a prison, occupies the site of a Danish fortress of the 10th century, which was almost wholly demolished by Robert Bruce in 1313. The grounds of Rushen Abbey (11th century), near the station, are now market gardens. Near by is the small building where the House of Keys assembled for about 170 years. Castletown was the seat of government of the Isle of Man from the 6th to the middle of the 19th century. Brewing, tanning and lime-burning are carried on. Near Castletown is King William's College, an Elizabethan pile, rebuilt after the fire of 1844. Pop. 1,817.

CASTOR, or **CASTOREUM**, an odorous substance obtained from two glandular sacs connected with the sexual organs in both sexes of the beaver. In past years it was utilized for medical purposes, especially as a remedy in diseases of the uterus, and in the case of catalepsy, hysteria and other spasmodic diseases. What little now reaches market is used an an ingredient of perfumes, but most of it is kept by northern trappers as a scent for baiting their traps, and is known as barkstone.

CASTOR OIL (*Oleum ricini*), the fixed oil expressed from the seeds of *Ricinus communis*, of the family *Euphorbiaceæ*. The oil is obtained from the seeds by various processes. The seeds are sometimes boiled and the oil skimmed from the water, or the oil may be taken up by solvents, such as alcohol, ether, etc. In the large manufacturing pharmacy houses in the United States the seeds are first warmed slightly and then passed between rollers, or other forms of pressure apparatus. The oil is collected and decanted, or mixed with boiling water and purified. The average yield of high-grade oil is from 40 to 50 per cent in weight. Care must be exercised in the amount of heating of the seeds, else a very active and acrid tox-albumin, ricin, which is present in the seed coat, is added to the oil. This tends to render the oil very griping in its action. Unscrupulous manufacturers have been known to add small quantities of ricin to adulterated oil. Seconds, or sorts, are inferior qualities of oil.

When fresh and pure castor oil should be a clear, colorless, viscid oil, with a faint, mild odor, a bland and unpleasant taste. Its specific gravity should be .950–.970 at 60° F. It should be soluble in equal parts of alcohol, in all proportions of absolute alcohol, or in glacial acetic acid, and tested to exclude other mixed oils; is soluble at 60° F. in three times its volume of a mixture of 19 parts of alcohol and one part of water. This test will detect an admixture of over 5 per cent of other oils. Castor oil congeals at 15° F. The chemical structure shows castor oil to be composed almost entirely of ricinoleic acid, $C_{18}H_{34}O_3$. It also contains palmitin, stearin, myristin and an acid principle. This is broken up in the intestines by saponification, and sets free the active agent of the drug's action. Castor oil is a reliable cathartic. It empties the bowel completely, largely by its stimulating intestinal peristalsis, and is probably the best cathartic for children with overloaded intestines. In intestinal fermentation and putrefaction accompanied by diarrhœa, it is excellent. It causes a number of loose, not very watery movements, attended with mild griping. There is a tendency to constipation following its use; hence, it is not of service in habitual constipation. As it is extremely disagreeable for many, its taste may be disguised by orange peel, or best in some aromatic frothy or carbonated mixture, as in coffee, soda water, or in gelatin capsule form. From a teaspoonful to a tablespoonful is the usual dose.

CASTOR-OIL PLANT, CASTOR-BEAN, or **PALMA CHRISTI**, a tropical herb (*Ricinus communis*) of the family *Euphorbiaceæ*, a native of Africa and Asia, whence it has become distributed in warm countries throughout the world. In cool climates it is a half-hardy annual, but in frostless regions it is a perennial, often becoming a small tree. Its large palmate leaves, sometimes more than two feet in diameter, and its green or red stems, which in the central United States may attain a height of 12 feet, and in the tropics 30 or 40 feet, are very striking in flower borders and clumps of shrubbery. The unisexual flowers are borne in terminal racemes, and the female ones are succeeded by three-celled spiny capsules which explode when the seed is ripe, throwing the seed to a considerable distance. The seeds have long been employed for making castor oil, which is used for lubricating, for making sticky fly-paper and in medicine. About half the demand of the American market is met by the crops grown in Kansas, Missouri, Oklahoma and adjacent territory, but since the introduction of petroleum products the oil has a smaller use as a lubricant than formerly, and since the importation of various palm oils its use in soap-making has declined. It is also less popular as a medicine than it used to be. The crop is not considered a paying one. Castor-oil pomace (the oil cake after the oil has been extracted) is a highly valuable nitrogenous fertilizer.

CASTOR AND POLLUX (the latter called by the Greeks Polydeuces), the sons of Tyndareus, King of Lacedæmon, and Leda, or, according to some, of Zeus and Leda. The fable runs that Leda to whom the god came in the form of a swan brought forth two eggs, one of which contained Pollux and Helen, the other Castor and Clytemnestra. Pollux and Helen, being the offspring of Zeus, were immortal; but Castor and Clytemnestra were

begotten by Tyndareus, and mortal. Homer's account is that both Castor and Pollux were the sons of Tyndareus, and that Helen was the daughter of Zeus. The two brothers were inseparable companions, equally brave and spirited, and attached to each other with the fondest affection. Castor was particularly skilled in the art of breaking horses, and Pollux in boxing and wrestling. They were among the heroes of the Argonautic expedition, in which they acquired divine honors; for a terrible tempest having arisen on the voyage, and all with loud voices calling on the gods to save them, there suddenly appeared over the heads of Castor and Pollux two star-like meteors, and the tempest subsided. From this time they were the patron deities of mariners, and received the name of Dioscuri ("sons of Zeus"); and from them the name of Castor and Pollux was given to the fires that are often seen on the masts of vessels in storms, and which are electrical phenomena. After their return they released their sister Helen from the confinement in which Theseus had for some time held her. They were also among the heroes of the Calydonian hunt. They wooed the daughters of Leucippus, Phœbe and Hilæira or Elæira, and carried them off and married them. Having become involved in a quarrel with Idas and Lynceus, the sons of Aphareus, Castor killed Lynceus, and was slain by Idas. Pollux revenged his brother's death by killing Idas, but full of grief for the loss of Castor, he besought Zeus either to take away his life or grant that his brother might share his immortality. Zeus listened to his request, and Pollux and his brother alternately resided one day on earth and the other in the heavenly abodes of the gods. It is doubtful whether the ancients understood them as being together or separate in their alternate passage between the upper and lower worlds. The former opinion seems to be the older; the latter to have gained ground subsequently. Temples and altars were consecrated to them. In great perils, especially in battles, the ancients believed that they frequently appeared to mortals as two youths on white steeds, in shining garments, with meteors over their heads. They were also represented side by side, either riding or standing, each holding a horse by the rein, with spears in their hands and stars on their heads. Rome accorded them special homage because of their supposed assistance at the battle of Lake Regillus. In the heavens the Dioscuri appear as one of the 12 constellations of the zodiac, with the name of Gemini (the Twins). Consult Albert, 'Le culte de Castor et Pollux en Italie' (1883); Paton, 'De Cultu Dioscurorum apud Græcos' (Bonn 1894).

CASTORIDÆ. See BEAVER.

CASTOROIDES, a gigantic, extinct, beaver-like rodent of the Pleistocene Epoch in North America. It was nearly as large as a black bear, and inhabited the cold, swampy, evergreen forests of the north, its remains being found chiefly in peat-bogs along with bones of the mastodon.

CASTRAMETATION. The art of laying out camps and of placing the troops so that the different arms shall afford support to each other in the best manner. No definite rules can be laid down, but the proper exercise of the art of encamping is so to place the troops that they can quickly form line of battle on the position they are to occupy. In the presence of the enemy the troops bivouac in line of battle; if safety permits, the tents may be pitched immediately in rear of the line of stacks, the tents of the company officers in rear of their companies, the tents of the Field and Staff in rear of the centre of the line of company officers. When not in the presence of the enemy, each battalion usually camps in column of divisions. The tents of each division are arranged in two lines facing each other; those of the right company face to the rear; those of the left company face to the front. The company officers' tents are arranged in line parallel to the flank of the column, facing the division-streets; the tent of the captain of the right company of each division is to the right (or left) of the line passing through the centre of the street, according as the officers are on the right (or left) flank of the column; his lieutenants are on his right (or left); the captain of the left company is on the left (or right) of the captain of the right company, the lieutenants of his company on his left (or right). The first sergeant's tent is on the flank of the company toward the officers' tents. The tents of the Field and Staff, when practicable, are in line parallel to those of the company officers, the colonel is opposite the centre of the column, lieutenant-colonel and major are on his right, the adjutant is on the left of the colonel; the other staff officers are on the left of the adjutant. The tents of the non-commissioned staff are in rear of the tents of the staff; they may be assigned to tents in the divisions.

The kitchens of the men are in line on the flank opposite the company officers; the sinks for the men are outside of the line of kitchens. The kitchens of the officers are in rear of their tents, the sinks for the officers are in rear of the line of tents of the Field and Staff. The positions of the color-line, guard-tents, sutlers' store, officers' horses and baggage wagons are prescribed by the colonel. The width of the division-streets, and the streets in front of the company officers, varies with the nature of the ground and the strength of the battalion. When the companies are large, the camp may be formed according to the above principles, in column of companies, the tents of each company being in one line, or in two lines facing each other.

A battalion of cavalry being in line with the usual intervals, to encamp, the men dismount, and, without forming rank, unsaddle and place their arms and equipments in line 10 yards in front of the horses; the blanket is placed on the equipment, moist side up. The picket-line is stretched between posts about six feet high, or is stretched on the ground, the ends being firmly secured; the horses are tied to the picket-line by the halter at intervals of a yard; if the picket-line be on the ground, they may be fastened to it by a strap about two and a half feet long, the strap being provided with a collar which is buckled around the pastern of the left fore-foot. The tents of the men are pitched in line about 15 yards in front of the picket-line, the intervals between companies being left free; the tent of the first sergeant is on the right; the arms and equipments are kept in the tents of the men. The kitchens of

the men are in line in front of their tents; the sinks in front of the line of kitchens. The tents of the company officers are in line about 30 yards in rear of their tents.

When artillery camp, the pieces and caissons are parked at 14 yards interval. The harness of the team of each carriage is on a rack on the right, and close to the carriage, so that the paulin can cover the harness. Horse equipments are kept on the racks or in the tents. The picket-line is 15 yards in rear of the caissons; it is stretched between posts about six feet high, the ends being firmly secured; the horses are tied to the picket-line by the halter at intervals of a yard. The men's tents are pitched in line about 30 yards in rear of the picket-line; the first sergeant's tent covers the carriages of the right section; the left guard-tent covers the carriages of the left section; the tents of each section are in the order of their pieces in park, and are closed on the centre, or to the right, so as to have a vacant space between the guard-tents and the tents of the left section. The men's kitchens are in line 10 yards in rear of the guard-tents, which may be faced to the right so that No. 1 can overlook the kitchen. The officers' tents are in line 30 yards in rear of the battery-tents; the captain's tent is on the right, covering that of the first sergeant. The officers' kitchens are 10 yards in the rear of the officers' tents; the battery wagon covers the captain's tent; the forge covers the left guard-tent. The sinks are 50 yards in rear of the wagons; the officers' sink on the right, the men's sink on the left.

The preceding order may be modified if circumstances require it. The battery wagon and baggage wagons may be in line with the pieces, the interval between the battery wagon and nearest piece being 14 yards, that between the battery wagon and left baggage wagon about 30 yards; the guard-tents half-way between the battery wagon and baggage wagons, facing to the rear; the forage pine between the guard-tents and the baggage wagons, the forge in line with the caissons and covering the right baggage wagon, the men's kitchens in line with the caissons, and covering the left baggage wagon, the officers' tents on a line perpendicular to the men's tents, facing them, and on the prolongation of one of the baggage wagons; the officers' kitchen in rear of the officers' tents, and on the prolongation of the forge. In a *horse battery*, if but one picket-line be used, it may be turned equally to the front around the flanks of the park; the battery wagon, forge and baggage wagons may be divided equally and placed on the flanks of the men's tents, facing inward, and so as to be on the prolongation of the bent portions of the picket-line. The picket-line may also be in one straight line, in which case the baggage wagons should be equally divided upon lines to the rear of its extremities. The horses are sometimes picketed in two lines, in which case the second line is 14 yards in rear of the first, and the wagons are placed in line 30 yards in rear of the men's tents. See CAMP.

CASTRATION, the removal of the testicles or ovaries of animals. Castration is usually performed to limit reproduction, to change the character of the working animal, making him more docile and easier to train, or to improve the quality of meat for eating, as in capons. In human beings castration is a surgical procedure and is usually performed for the relief of some irremediable or malignant disease. Thus in tuberculosis and cancer of the testicles, and in malignant or painful disease of the ovaries, the operation is justifiable. There has been a large amount of needless removal of the ovaries in women. The after results are often more annoying than the original disease.

The change produced in men by emasculation is highly remarkable, giving rise to physical and psychical alterations nearer the female type. The elasticity of the fibres and muscles is weakened, and the subcutaneous tissues become filled with a much larger quantity of fat; the growth of the beard is prevented; the upper part of the windpipe contracts considerably, and the castrate acquires the physiognomy and voice of a female. The most numerous class of castrates are those who are made such by the removal of the testicles. Another class are not deprived of the parts of generation, but have them ingeniously injured in such a manner as to leave them the faculty of copulating, but deprive them of the power of begetting. Juvenal mentions these as the particular favorites of the licentious Roman ladies. To the third class belong those who are entirely deprived of their genital members. They are used in preference, by the Turks, as keepers of their women. The castrates of all three classes are called eunuchs. Those of the third class, to distinguish them from the two others, are frequently termed entire eunuchs. The word eunuch is Greek, and signifies "guard" or "keeper of the bed." The castration of adults produces some change in the disposition, but little in the bodily constitution. According to the accounts of ancient historians, the Lydians, celebrated for effeminacy, castrated women. The latter are said to have used these beings as guards of their wives and daughters. With females the operation produces a completely opposite effect to that which it has on men. The character changes, a beard appears on the chin and upper lip, the breasts vanish, the voice becomes harsh, etc. Boerhaave and Pott relate mediæval instances of this kind. Among the evils which religious fanaticism has at all times produced, castration is conspicuous. The Emperors Constantine and Justinian were obliged to use their utmost power to oppose this religious frenzy, and could put a stop to it only by punishing it like murder. The Valerians, a religious sect whose minds had been distracted by the example of Origen, not only considered this mutilation of themselves a duty which religion imposed on them, but believed themselves bound to perform the same, by fair means or foul, on all those who came into their power. In Italy the castration of boys, in order to form them for soprano singers, was in use for a long time. Clement XIV prohibited this abuse, which, notwithstanding, did not cease till comparatively recent times, and in some Italian towns was not only suffered but exercised with such shameful openness that the practitioners gave public notice of their profession. In modern times severe laws were enacted against castration, and the custom is probably now extinct. Beings thus mutilated were common on the European stage. It is remarkable that so odious and unnatural an

operation should produce the fine effect on the tones of the singer, which all had to acknowledge notwithstanding the disagreeable effect of the association.

CASTRÉN, kās-trān', **Matthias Alexander,** Finnish philologist: b. Tervola, 2 Dec. 1813; d. Helsingfors, 7 May 1852. While attending, as a young man, the University of Helsingfors he conceived the project of tracing out the various detached branches of the Finnish races and languages, and presenting their ethnological and philological phenomena in one general view. Following out this idea he undertook in 1838 a pedestrian excursion through Finnish Lapland, and another in 1840 through the district of Karelia, with the view of studying the primitive language of that country, and enabling himself to translate therefrom into Swedish the great Finnish epic of the 'Kalevala.' This last work was accomplished by him after his return. He soon, however, resumed his travels, and for several years continued to prosecute his researches among the nations of the Arctic regions, both in Europe and Asia, including the Norwegian and Russian Lapps, and the Samoyeds of Siberia and the coasts of the White Sea. Naturally of a weakly constitution, and in a failing state of health, he was frequently obliged in addition to submit in the course of his journeys to the most extreme privations. Having returned home from his last journey to the Samoyeds, he was appointed in 1851 professor of the Finnish and old Scandinavian languages in the University of Helsingfors, but died before he had been able to add much more to his work — a martyr to the cause of science. Among his writings are his translation of the 'Kalevala'; 'Elementa Grammatices Syrjænæ'; 'Elementa Grammatices Tscheremissæ'; and 'De Affixis Personalibus Linguarum Altaicarum'; besides travels and other works published after his death. His works were edited in Swedish (in 5 vols., 1852–58) and were supplemented in 1870 by another volume containing a biography by I. V. Snellman. A German translation was published between 1853 and 1862, under the auspices of the Academy of Saint Petersburg, by Anton Schiefner. They include, besides the works enumerated, grammars of the Samoyed, Buryat, Tungus, Koibalic languages.

CASTRES, kāstr, a town of southwest France (ancient CASTRUM ALBIENSUM) in the department of Tarn, 46 miles east of Toulouse, on the Agout, which divides it into two parts — Castres Proper, north side, and Villegoudon, south side of the river. The public buildings include the hôtel de ville, formerly the episcopal palace, which contains a public library, and has a garden laid out on the plan of the Tuileries; cavalry barracks, etc. The manufactures consist of fine cloths, coarse cloth for the troops, flannels, blankets and other woolen goods, linen, glue and black soap. There are also bleaching-grounds, dyeworks, tanneries, paper-mills, forges, brass-foundries and earthenware works. Trade is also carried on in silk, cotton, liqueurs and confectionery. Castres has a communal college and two seminaries. The town arose round an abbey of the Benedictines (which is said to have been founded in the 7th century), and was already in the 12th century a place of importance. During the religious wars of the 16th century, in which its inhabitants espoused the Protestant cause, Castres was the scene of many conflicts. Louis XIII, to whom the town surrendered in 1629, ordered its fortifications to be razed to the ground. Pop. 27,830.

CASTRIES, kās'trē', **Charles Eugène Gabriel de la Croix,** MARQUIS OF, French soldier: b. 27 Feb. 1727; d. Wolfenbüttel, 11 Jan. 1801. He entered the army, fought at Dettingen and in lower Alsace, became lieutenant of Languedoc and governor of Montpellier and Cette, and under Marshal Saxe commanded the army in Flanders, where he covered the sieges of Menin, Ypres and Courtray, and ended the campaign with the battle of Courtray. He afterward fought at Fontenoy, Raocoux and Laufeld. During the Seven Years' War he added greatly to his fame, was made lieutenant-general and was dangerously wounded in the battle of Rossbach. In 1783 he was marshal of France, and emigrating in 1791 found an asylum with the Duke of Brunswick. He subsequently commanded the army of the French princes in Champagne, and countersigned the manifesto issued by Monsieur in 1793. In 1797 he formed, in conjunction with Saint Priest, the so-called cabinet of Louis XVIII, at Blankenburg.

CASTRO, kās'trō, **Agustin,** Mexican poet: b. Cordova, Vera Cruz, 24 Jan. 1728; d. Bologna, Italy, 1790. He became a Jesuit priest and a teacher of philosophy, and was a skilful translator of classical authors. Among his original works in poetry are 'Hernán Cortez' and 'Charts,' a guide for young poetic genius. His versions of Sappho, Euripides, Horace, Seneca, Milton and Fénelon have received high praise from scholars. See MEXICO, LITERATURE.

CASTRO, Cipriano, Venezuelan military leader: b. Capacho, Venezuela, near the frontier of Colombia, about 1855. His parents were Spanish mestizos of the peasant class. He attended school in Capacho. While still a very young man he took an active part in politics in Capacho, as a Liberal. His first military exploit consisted in scoring a moderate success in the so-called "Battle of Capacho" (1886) against Morales, the local representative of the Lopez government. He remained a leader of the Liberal party in his state until 1892. In that year began Crespo's rebellion against Andueza. Castro, supporting Andueza's cause, was victorious in the battle of 15 May 1892, in Táriba, defeating Morales who now was under Crespo's command. In Caracas, however, the insurgents triumphed. Crespo entered the capital 6 Oct. 1892. Castro remained in control of Táchira and Merida, but before the end of the year withdrew across the Colombian frontier and bought a farm near Cúcuta in the department of Santander. For the next six or seven years he was a farmer and cattle-raiser. Invited by Crespo to take office as head of the custom-house at Puerto Cabello, he declined this offer, but promised Crespo not to join his enemies or attack his government. Andrade was Crespo's successor. Castro went to Caracas and called on the new President. Accounts of this visit differ. Castro's partisans assert that he again refused the tender of an office under the government; according to another version he was

insulted, and left the Yellow House vowing vengeance. When he returned to his home some political friends and relations of Andrade's who lived in Cúcuta procured from the Colombian government an order for his arrest. For about two months he was in hiding; then he invaded Venezuela with only 60 men (23 May 1899). His old followers in Táchira joining him, in three days he collected a force of 1,500. The first skirmish was in the country between San Cristóbal and Rubio. In Las Pilas the commander of the government's frontier troops fell. At Zumbador about 2,000 men led by Morales were defeated. Castro laid siege to San Cristóbal, where Peñalosa was strongly entrenched. About 6,000 men under Hernandez were sent against him from Caracas. An indecisive engagement occurred. Then Castro left Hernandez in the rear, and marched toward the capital, defeating several government forces on the way. Andrade having fled the country, Castro entered the capital, opened the prison in which Hernandez had been confined for many months, and declared himself "jefe supremo" — neither President nor dictator but "supreme military leader." The Constituent Assembly made him provisional President of Venezuela, 30 March 1901, and on 20 Feb. 1902 he was elected President for the term of six years. Hernandez promptly revolted, and was put back into prison. Celestino Peraza was the next rebel; and after Peraza came Matos, who intrigued to gain the support of foreign governments. He resigned the presidency temporarily on 9 April 1906, but soon resumed it. Castro involved Venezuela in dangerous quarrels abroad; the most important being those with the European creditor nations in 1902–03, with the United States 1904–08, with Colombia and France in 1905. In all these difficulties Castro acted in a high-handed, unprincipled manner. He was re-elected unanimously for a full term in 1905, and proclaimed a general amnesty for all political prisoners. His difficulties with the United States arose over the confiscation of the properties of the New York and Bermúdez Asphalt Company. In 1907 Venezuela satisfied her obligations with Great Britain, Germany and Italy in accordance with the awards of The Hague Tribunal. In the same year Castro suppressed two rebellions with great cruelty, executing many of the leaders and those connected with their plots. Further trouble ensued with the United States over the claims of the New York and Bermúdez Asphalt Company. Castro held out but in December 1908 went to Europe to undergo surgical operation. A revolution broke out soon after which placed Vice-President Juan Vicente Gomez in the presidency. Castro's policy was reversed, and all claims amicably adjusted. Castro made several attempts to return to Venezuela, but was unsuccessful. He resided in Spain and France for several years and in 1916 came to the United States. See VENEZUELA.

CASTRO, Inez de, Spanish lady: d. 1355. She was descended from the royal line of Castile. After the death of Constantia, wife of Pedro, son of Alfonso IV, King of Portugal, in 1345, Inez was secretly married by Pedro, whose mistress she had already been. As he steadily rejected all propositions for a new marriage, his secret was suspected, and the envious rivals of Inez were fearful that her brothers and family would gain a complete ascendency over the future King. At length Alfonso resolved to put Inez to death. The first time that Pedro left Inez, the King hastened to Coimbra, where she was living in the convent of Santa Clara with her children. The arrival of Alfonso filled the unhappy lady with terror. She threw herself with her children at the King's feet, and begged for mercy. Alfonso was softened, but afterward gave his counsellors permission to commit the murder, and it was executed that very hour. Inez expired under the daggers of her enemies. She was buried in the convent where she was murdered. Pedro took arms against his father, but soon became reconciled to him. Two years later Alfonso died; the assassins had already left the kingdom and taken refuge with Pedro the Cruel of Castile. An exchange of fugitives was carried out. Of the three murderers of Inez, one escaped, but the other two were tortured in the presence of the young King Pedro at Santarem in 1360. Their hearts were torn out, their bodies burned and their ashes scattered to the winds. Two years later, it is said, King Pedro at Cataneda declared on oath that after the death of Constantia he had obtained the consent of the Pope to his union with Inez, and had married her. The archbishop and Lobato confirmed the assertions of the King; and the Papal document to which the King referred was publicly exhibited. The King caused the body of Inez to be disinterred, and placed on a throne, adorned with the diadem and royal robes, and required all the nobility of the kingdom to approach and kiss the hem of her garment, rendering her when dead that homage which she had not received in her life. The body was interred at Alcobaça, where a splendid monument of white marble was erected, on which was placed her statue, with a royal crown on her head. The history of the unhappy Inez has furnished many poets of different nations with materials for tragedies, and the Portuguese muse has immortalized her through the pen of Camoens, in whose celebrated 'Lusiad' the history of her love is one of the finest episodes.

CASTRO, João de, Portuguese navigator: b. Lisbon, 7 Feb. 1500; d. 6 June 1548. In 1538 he accompanied the viceroy Garcia de Neronha, his uncle, to India, as commander of a vessel, and in 1540 was in the expedition that explored the Red Sea, of which he made charts and scientific descriptions. His profound knowledge of mathematics and languages made these works of great value. They were published under the title of 'Roteiro' (latest ed. by Corvo, Lisbon 1882). After his return he was made commander of a fleet to rid the European seas of pirates; was appointed governor of India in 1545, in which office he defeated the great army of the Moors, under Adhel Khan, and completely subjugated Malacca. In 1547 he was commissioned viceroy of India, but died shortly afterward. A statue was erected in his honor at Goa.

CASTRO, José Maria, Costa Rican statesman: b. San José, 1 Sept. 1818; d. 1907. He was educated at the University of Leon, Nicaragua, and held positions under the government of

Costa Rica. As minister under José Maria Alfonso, he was instrumental in establishing the University at Santo Tomás. In 1846 he was Vice-President and in 1847 was elected President. Among his reforms were the founding of a normal school, girls' school, the creation of the office of "City Physician," local public charities bureaus; abolishment of the death penalty for political adversaries; and the establishment of Costa Rica as an independent state. After Costa Rica withdrew from the Central American states, he resigned the presidency, but held diplomatic positions. He received the official designation of "Founder of the Republic of Costa Rica." From 1866 to the rise of the Jimenez government (1868) he was again President.

CASTRO Y BELLVIS, bĕl'vēs, **Guillén,** Spanish poet and dramatist: b. Valencia 1569; d. Madrid, 28 July 1631. Next to Lope de Vega he is the greatest Spanish dramatic poet of his day. He lived at an age when Spanish drama was almost at its best; for the dramatic writers who followed him and Lope de Vega added practically nothing to the essentials of the drama. Their efforts were spent in adding literary adornments to it. Castro's work had a strong influence on his own and succeeding generations of dramatists and, in a secondary sense, on all Spanish literature. He was born of an old and noble family; and such comparatively slight information as survives relative to his life shows that he had always friends in high positions who were constantly interesting themselves in his welfare. He was successively captain of the mounted coast guard of Valencia, governor of Seyano and occupant of other high positions under the government. From the Duke of Osuna he received a pension of 1,000 crowns; and the Count of Olivares secured for him a pension of like amount from the King. Through this same strong court influence he was created a knight of the Order of Saint James in 1623. All his friends, admirers and followers ranked him as at least the equal in dramatic talent to Lope de Vega.

The age in which Castro lived was one of encouragement of literature; and Valencia, the "romantic home of the Cid" was one of the two great literary centres of Spain. Literary societies and guilds formed a prominent part of the life of the city; and literary contests, lyrical, epic, dramatic and pastoral, formed a part of the order of the day. Castro took a prominent part in these literary contests and won many prizes and honors in competitions held by the Church, the State and the literary guilds. A very active theatre completed the incentive to literary and, more especially, dramatic life, to which Castro was irresistibly drawn. At the age of 20 he was already counted among the promising young poets of his day and he apparently counted among his friends the powerful and brilliant literary set of Valencia. He appears to have been much of a spendthrift and to have been cursed with an imperious and haughty temper which continually estranged from him friends of high estate; and as his reputation as a poet and dramatist grew, his infirmities of temper seem to have increased and to have been the direct cause of the loss of many of the social and material advantages which he had enjoyed in his earlier life. It was maintained by his earlier biographers that he finally became reduced to such poverty that he was buried at the public expense. But his will, which was signed a few days before his death, and which is still in existence, would seem to disprove this, as it disposed of considerable property. He undoubtedly had, to the end of his days, a certain income from his literary work which was in constant demand by the regular theatres and the Church, and must, therefore, have been well paid for. Moreover it is known that the habit of the Order of Santiago was conferred upon him in Madrid in 1623, only eight years before his death.

To Castro the historical drama in Spain owes much; and his influence in this literary field was strongly felt in France and England. Castro's 'Don Quixote' was imitated by Guérin de Bouscal and presented in Paris in 1635; Moreto found his model for 'El Ligno don Diego' in 'El Narciso en su opinion'; Fletcher's 'Love's Care' is derived from 'Fuerza de la costumbre'; and Calderon's 'Magico prodigioso' from 'El prodigio de los montes.' Even to-day the best known of his dramas, 'Las mocedades del Cid,' slightly modified, is ever welcome on the Spanish stage; and it is looked upon in Spain as one of the great literary inheritances of the Spanish people. This play is avowedly the inspiration of Corneille's 'Le Cid.' From the purely dramatic point of view the 'Cid' of Castro is superior to that of Corneille, though the latter gains in simplicity what it loses in the picturesque effects of the Spanish original. Castro set a taste in Spanish drama which long prevailed, and which, to a certain extent, persists to-day. His characters reflect, especially in the 'Cid,' the chivalrous or romantic times in which they lived. His plot and characters are very animated and are dressed out in beauty of imagery and thought. Castro is, therefore, in a sense, the father of the drama of chivalry. His inventiveness and his management of plot are superior to that of any Spanish dramatist previous to his time. In all of these respects Castro's 'Mocedades del Cid' is superior to Corneille's 'Cid.' The former and 'Las Hazañas del Cid' together, in a sense, form one dramatic work which has made the name of Castro known among all the literary nations of Europe. In France Castro was held in even higher esteem than in Spain; and to the popularity of his numerous dramas, some 40 in all, is due his literary influence on succeeding generations for both good and for bad. While he bequeathed to the drama a vividness, reality, force and action previously lacking in Spain, he also left it a tendency to licentiousness and disrespect for the laws and customs of conventionality; and he glorified the romantic age with its intrigues, its rule of force, its duels and other conflicts. Born in Valencia, the home of the Cid, he was deeply inspired by the legends and glorious traditions of his native city; and his patriotism frequently bursts out into ardent flame. With wonderful facility and an appearance of reality and truth, he recreates chivalric conditions and feudal manners; and the old sentiments of honor and patriotism are ever at his beck and call. But he is lavish in more titanic effects. The meet-

ing of infidel and Christian, the life of the Crusades and the shock of battle he handles with equal facility and familiarity.

When he turns to comedy, which he frequently does, Castro lays bare the follies, vices and customs of his age. Life as he knows it he put on the stage. For the most part, the life of his day was not a good life; and Castro makes it no better than it actually was. Hence his plays have been condemned for their immorality and his detractors have lost sight of his vast and many-sided contributions to the stage, in their efforts to discredit him, which unfortunately were, for a time, only too successful. His dramatic work covers the whole wide dramatic field. His most noted historical dramas are: 'Las mocedades del Cid'; 'La justicia en la piedad'; 'Pagar en propia moneda'; 'Allá van leyes do quieren reyes'; 'La humanidad soberbia y el amor constante'. To his romantic dramas belong 'El Conde de Alarcos'; 'El nacimiento de Montecinos'; and 'El desengaño dichoso'; while *to the capa y espada class* belong 'El narciso en su opinion'; 'La fuerza de la costumbre'; and 'Los mal casados de Valencia.' His dramas of *costumbres y caracteres* in which he displays criminal loves, intrigues and, in general, the follies of his day, and holds the mirror up to life in a masterly manner, include 'El curioso impertinente'; 'Don Quixote'; 'La verdad averiguada y engañoso casamiento'; 'El pretender con pobreza'; 'Engañarse engañado'; and 'El perfecto caballero'. His freedom in depicting society as he found it has placed his dramas on the taboo list in most Protestant countries. Mythology, too, met with skilful and sympathetic treatment at the hands of Castro in the drama 'Progne y Filomena.' The semi-mystical, semi-religious drama he also handled better than his predecessors in 'El mejor esposo San José'; 'Las maravillas de Babilonia'; 'El prodigio de los montes y mario del cielo Santa Bárbara' and 'La degollación de San Juan Bautista'. He has attempted heroic tragedy with considerable success in 'Dido y Eneas.' Among his other dramas are 'El Conde de Irlos'; 'Los enemigos hermanos'; 'Cuando se estima el honor'; 'El vicio de los extremos'; 'La fuerza de la sangre.' The following works have also, with apparently good reason, been attributed to Castro: 'El caballero bobo'; 'El dudoso en la venganza'; 'Ingratitud por amor'; 'El nieto de su padre'; 'Donde no está su dueño está su duelo'; 'El enamorado mudo'; 'Quién malas manas ha'; 'Quién no se aventura'; and 'La tragedia por los celos.' He also wrote dramas in collaboration with other dramatists. In two of these, 'La manzana de la discordia,' and 'El robo de Elena,' he worked with Mira de Mescua. In 1621 'La primera parte de las comedias de don Guillén de Castro' was published at Valencia; and the second part four years later at the same place. See POEM OF THE CID. Consult 'Biblioteca de autores españoles Vol. XLIII' (which contains seven of his plays); Fœrster, W., 'Las mocedades del Cid' (Bonn 1878); Merimé, E., 'Première partie des mocedades del Cid' (Toulouse 1890); Rennert, H. A., 'Ingratitud por amor' (Philadelphia 1899).

JOHN HUBERT CORNYN,
Editorial Staff of the Americana.

CASTRO-DEL-RIO, Spain, a town in the province of Córdoba, 16 miles southeast of Córdoba, on a slope above the Guadajoz. The more ancient portion is surrounded by a dilapidated wall, flanked with towers, and entered by one gate, which was defended by an Arab castle, now also ruinous. The modern portion is outside the walls, and extends along the foot of the hill on its north side. The most of the streets are wide and regular, lined with well-built houses and handsome public edifices. The church is large and handsome, and there are also several convents, two colleges, primary schools, hospitals and manufactures of linen, woolen and earthenware. There is a considerable trade in agricultural produce. Pop. about 12,000.

CASTRO-URDIALES, oor-dē-ä'lās, Spain, seaport town, Santander province, on the Bay of Biscay, connecting by a branch line with the Bilbao-Santander Railway. An ancient town with a mediæval castle and parish church, it has grown rapidly since 1870, through the development of neighboring iron mines and increased railway facilities. In a recent year, exports of iron rose to 277,200 tons. Fishing and the canning of fish, especially sardines in oil, is also a thriving industry. Pop. 14,200.

CASTROGIOVANNI, kä-strō jō-vän'nē, or **CASTRO GIOVANNI** (anc. ENNA), a city of Sicily, in the district of Caltanissetta, on a plateau in the centre of the island, 4,000 feet above the sea. The climate is healthful, the soil fertile and water abundant. The old feudal fortress of Enna is the chief edifice. It contains also a cathedral, founded in 1307, a public library, a museum, a technical institute and a castle built by Frederick II of Aragon. It was the fabled birthplace of Ceres, and the site of her most famous temple. About five miles distant is the lake of Pergusa, where Proserpine, according to the poets, was carried off by Pluto. During the first servile war the insurgent slaves made Enna their headquarters. It was captured by the Saracens in the 9th and by the Normans in the 11th century. It has trade in sulphur and rock salt. Pop. 28,932.

CASTRUM DOLORIS, a Latin term signifying castle of grief, has a different meaning from *catafalque* (q.v.). The latter is used to denote an elevated tomb, containing the coffin of a distinguished person, together with the tapers around, ornaments, armorial bearings, inscriptions, etc., placed in the midst of a church or hall. The *castrum doloris* is the whole room in which the *catafalque* is elevated, with all the decorations. The sarcophagus, usually empty, is exposed for show upon an elevation covered with black cloth, under a canopy surrounded with candelabra. Upon the coffin is laid some mark of the rank of the deceased, as his epaulette or sword, and, when the deceased is a sovereign or a member of a ruling family, princely insignia are placed on surrounding seats. The French call the *castrum doloris, chapelle ardente,* sometimes also *chambre ardente;* but the latter has also a separate meaning.

CASTUERA, käs-too-ā'rä, Spain, town in the province of Badajoz, near the right bank of the Guadaleja. Most of its streets are straight, clean and well paved. It has two

squares, lined with substantial houses; the principal one contains the town-hall, prisons and spacious modern parish church. The inhabitants are engaged in weaving, making earthenware, tiles, bricks, shoes. Trade is carried on in cattle, wool, wine, grain and oil. Pop. 6,322.

CASUARINA, kăs-ū-ą-rī'ną, or **BEEFWOOD,** the single genus of the family *Casuarinaceæ,* or cassowary-trees. There are about 30 species, natives chiefly of Australia. They are jointed leafless trees or shrubs, having their male one-stamened flowers in whorled catkins, and their fruits in indurated cones. Some of them produce timber called beefwood, from its color. *C. quadrivalvis* is called the she-oak. *C. equisetifolia* is the best-known species, and is much cultivated in Florida and California, and in tropical regions generally.

CASUISTRY, the science or art of determining cases of conscience and the moral character of human acts; so called from *casus conscientiæ,* a case of conscience. Wherever the question arises, Is such an act allowable by moral law? there is a case of conscience and matter of casuistry, and in deciding the question for himself, as everyone habitually does, everyone is a casuist. But in current usage a casuist is one who, skilled in the prescriptions of the divine moral law and its interpretation whether by lawgivers, moralists or theologians, studies either suppositions or actual cases of conscience and judges whether a given act, or even a given thought is consistent with or in violation of moral law — for, unlike the civil lawgiver or the ministers of civil law, the casuist must determine the moral character of thoughts no less, or rather more, than of acts. The professional casuist is inevitable in the system of the Catholic Church, where the minister of religion, in his capacity of *confessarius* or confessor must be the counsellor and director of penitents and resolve for them questions of guilt or innocence, questions touching the obligation to restitution, for example of goods, or reparation of damage to a neighbor's reputation by slander; granting or withholding absolution according to the merits. For the minister of the sacrament of penance acts under Jesus Christ's commission, whose sins ye shall forgive, whose sins ye shall retain, shall be forgiven or retained; and to execute that commission the minister of the sacrament must decide for himself and the penitent the moral character of the acts. The science or art of casuistry has doubtless been carried to extraordinary lengths; but though the questions which it treats are such as touch individually and most intimately daily and hourly the many millions of souls who resort to the confessional, the works of writers on casuistry, though voluminous, would count as a scant armful compared with only one part of the works contained in a law library — those which record the decisions of the civil courts. It is true also and inevitable that casuistry like law lore is often employed as a means of escaping from legal penalty or of quieting the sense of guilt. As there are lawyers who for a fee will defend any cause however defenseless morally, even to the extent of working injustice — loss of property, loss of reputation to the party opposite — so there are casuists who by their overinclining to an indulgent interpretation of the divine moral law, release or cut the nerve of moral responsibility, administer an opiate to conscience.

Probabilism is the name given to the doctrine which declares to be lawful *in foro conscientiæ* an act the moral correctness of which is affirmed by any moral theologian of weight (*doctor gravis*); or, as defined by Liguori, a probable opinion is one which rests on a solid foundation (*fundamento gravi*) both of reason and of authority, so that it is able to move the assent (*flectere assensum*) of a prudent man, though with fear regarding the opposite. But a writer in a great encyclopædia, who regards probabilism as "the most remarkable doctrine they (the casuists) promulgated — a doctrine which it is hard to believe that any one ever ventured to assert" teaches that "according to probabilism" "any opinion which has been expressed by a 'grave doctor' may be looked upon as possessing a fair amount of probability, and may, therefore, be safely followed, even though one's conscience may insist upon the opposite course": the last clause is gratuitous and has no warrant in the teachings of Catholic moralists, who unanimously hold that an act done in defiance of conscience, even be it a plainly erroneous conscience, is a sin.

Viewed in the abstract, the rule of the probabilists is not an unreasonable one; it is acted upon daily by whoever, doubting his own judgment, asks counsel of others whom he regards as trustworthy advisers, even though they be not grave doctors (*graves doctores*). It is admitted that some of the probabilists, even the greatest of them, as Escobar, Suarez, Busembaum, did not always guard the doctrine against misconstruction, and gave occasion for views of moral obligation which were too lax: but the ecclesiastical censure has fallen upon such erroneous teachings, without discrediting for Catholic moralists the principle of probabilism. Let any other school of moral teaching set to itself the same task which confronts the moral theologian of the Catholic Church, that is, to define with precision the moral character of every act, every thought, every imagination that has relation to the moral law, and it will be seen whether probabilism must not have a place in its system.

CASUS BELLI, the material grounds which justify (or are alleged by one of the parties concerned to justify) a declaration of war (q.v.). The *casus belli* is not seldom a very trifling one, and does not necessarily indicate the real *causa belli* or cause of the war.

CASWELL, Richard, American lawyer: b. Maryland, 3 Aug. 1729; d. Fayetteville, N. C., 20 Nov. 1789. He removed to North Carolina in 1746; practised law and was a member of the colonial assembly (1756–70). He was a delegate to the Continental Congress 1774–75; was president of the Provincial Congress which framed the State constitution (1776), and 1st governor of the State 1775–79; re-elected 1784–87; comptroller-general of the State 1782–84; was also a delegate to the convention which framed the Federal constitution in 1787. He was major-general of the Newbern district in the Revolution.

CAT, a predatory animal of the family *Felidæ* (q.v., for physical characteristics). All

feline animals are "cats" in the broader sense; but in the more restricted and common usage the name refers to the smaller, long-tailed, typical members of the genus *Felis*. The type is the wildcat (*F. catus*) of Europe and western Asia, but now extinct in Great Britain, and very rare except in the wilder forests of Germany, Austria and eastward. It is somewhat larger and of stouter build than the domestic cat; its body is yellowish gray, with a dark line along the back, and many darkish stripes on the sides and across the legs; its tail, of moderate length, is ringed and tipped with blackish; and the soles of the feet are black. It is a fierce animal, preying upon anything it is able to overcome, goes abroad chiefly at night, and makes its lair in hollow trees and crannies among rocks, and is almost untamable. This brief description of habits will answer for most of the other cats to be mentioned, varying with their diverse habitats; but some of the others have shown themselves far more amenable to domestication. It should be noted that the American "wildcat" is not this species, but a very different one — the short-tailed lynx (q.v.).

Mivart enumerates in his monograph 36 species of these smaller cats, but some of them are probably mere varieties of others; and we can here mention only a few of the better known ones, larger descriptions of which may be found under their names. The most important one is the Egyptian or Caffre cat (*F. libyca*), the main source of our household pets, described in the article CATS, DOMESTIC. Another important African species is the widely distributed serval (q.v.) whose fur is valuable. A reddish-brown species, called the golden-haired (*F. rutila*), and two or three others, little known, inhabited the West African forests. Asia has many varieties of cats, some of which are of large size. Thus the spotted cat (*F. tristis*) of the interior of China has a body nearly three feet long; and nearly as big is the handsome, spotted and striped fishing cat (q.v.) of eastern India and the Malayan Peninsula. Others of note are the leopard cat (q.v.) of Bengal and eastward; the common Indian jungle cat or chaus (q.v.); the little rusty-gray jungle cat (*F. rubiginosus*), which is the smallest of its tribe; the Manul of northeastern Asia; the flat-headed Malayan cat (*F. planiceps*), which is uniformly brown in hue; the marbled cat (*F. marmorata*), richly ornamented with wavy, irregular lines and blotches of color, and the bay or golden cat (*F. aurata*) of northern India, Malaya and the East Indies. This last animal is of special interest as it is believed to be the parent stock of the Siamese domestic cat, which was formerly reserved for royalty alone. Its fur is pale golden-chestnut in color, becoming bay along the back; the throat and under parts are white, while the face is strikingly ornamented with stripes of black, white and orange.

America has several species of wildcats besides the large jaguar (q.v.) and the puma or cougar (q.v.); those of North America are more properly defined as lynxes (see LYNX), but Central and South America have several typical felines. Of these the ocelot, the margay, the eyra and the jaguarondi, are described elsewhere under their names. A very distinctive and well-known species of the plains' region south of Brazil is known as grass cat, pajero and pampas or grass cat (q.v.). See CHEETA, FELIDÆ; LYNX.

Bibliography.— Eliot, 'Monograph of the Felidæ' (folio, colored plates, London 1878); Jerdon, 'Mammals of British India' (London 1865); Anderson, 'Zoology of Egypt' (London 1902); Mivart, 'The Cat' (New York 1892); Hamilton, E., 'The Wildcat of Europe' (London 1896); Hamilton, J. S., 'Animal Life in Africa' (New York 1912) and Cassell's, the Royal and the Standard Natural Histories.

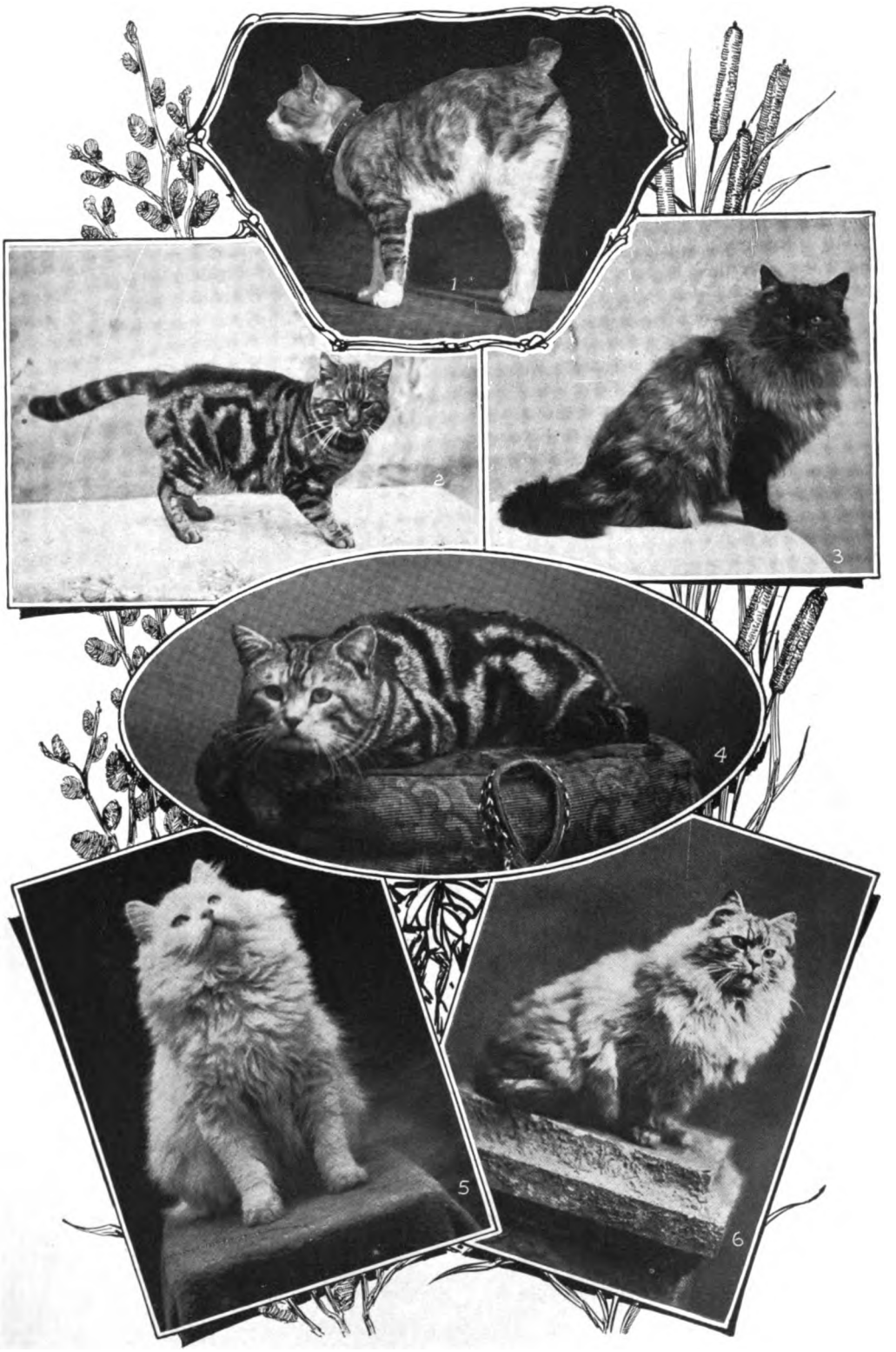
ERNEST INGERSOLL.

CAT, Domestic, The. The influence of the domestic cat upon American civilization has received less consideration than it deserves, for a great deal of the advance of agriculture as well as of the spreading out over the vast woodland and prairies has been made possible by this much abused and misunderstood animal. How much food cats have saved, how much property they have guarded from destruction, what plagues of vermin they have kept in check, from the time this country was first settled, it is impossible to compute. But for their sleepless vigilance the large cities would quickly be overrun with rats and mice.

The government appropriates money every year for the maintenance of cats in the post-offices and other public buildings of the larger cities, in order to keep down the vermin that would gnaw holes in mail-sacks and destroy public records and other property. It is recognized in the national printing office of France, where vast quantities of paper are stored, and where an army of cats is retained to keep the mice in check. In Vienna it is regarded as a part of good municipal government to take care of the cats. The United States government has systematized its cat service in public institutions, and in Pittsburgh a certain strain has been bred to live in cold storage houses, and is developing characteristics peculiar to this kind of life. In warehouses, corn-cribs, barns, mills and wherever grain or food is stored, cats must be kept. But to be effective, they must be taken care of, for well-fed cats are the best mousers.

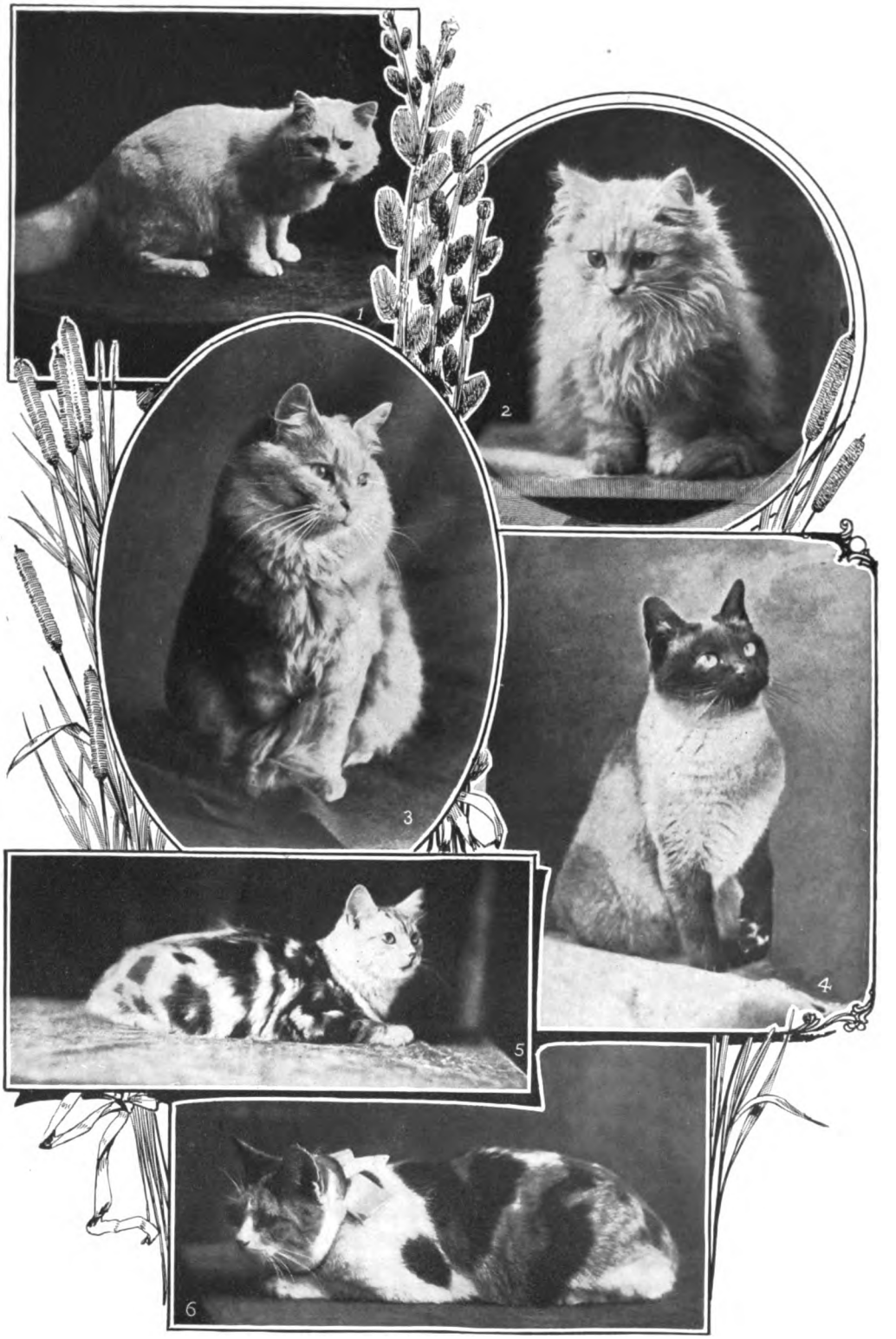
Origin and History of the House Cat.— Formerly it was carelessly thought that our house cats were simply the progeny of tamed pairs of the European wildcat; but anatomy denied the probability of this, and historical investigation showed that they came from another source. This source is the North-African "gloved" or "Caffre" cat (*Felis libyca*), which, as historical evidence, including innumerable mummies, shows, was domesticated by the Egyptians before the time of the oldest monuments of their civilization. Moreover, the characteristic specific markings of the caffre cat (still wild as well as tame in the Nile Valley) reappear unmistakably in our common house cats, in spite of the fact that interbreeding with other species, and various local races, has intervened. A well-marked variety of this cat was to be found anciently, and now, in Syria and eastward, known as the Mediterranean cat. It is established that many centuries before the Christian era the Egyptians, Cretans, Phœnicians and other men of the Levant were constantly voyaging all over the Mediterranean Sea, and founding trading-posts on both its shores, where finally arose and spread the extensive civilizations of Greece and

CATS



1 Manx
2 Brown Tabby
3 Smoke Persian
4 Silver Tabby
5 White Persian
6 Shaded Silver

CATS



1 White Persian
2 Light Silver
3 Cream Persian
4 Siamese
5 Silver Persian
6 Short Hair Tortise Shell

of Rome on the north, and of Carthage on the south. With these colonists undoubtedly went their friendly and useful mousers. That they then were crossed somewhat with the native wildcat seems to be shown by the appearance of the peculiar form we call "tabby" cats. This, in brief, is the history of the common European house cat, whence have come, by emigration, those of America and most of the civilized world.

In the remote and isolated East, however, exist races of domesticated cats of more local origin. Prof. G. Martorelli, of Milan, Italy, has made a special study of this whole subject; and he has concluded that the ordinary domestic cat of India has descended from the Indian desert cat (*Felis ornata*). From it, he says, are derived their common spotted breed, while the fulvous breed seen in India has been produced by a cross with the native jungle cat (*Felis chaus*). Both these have interbred with the imported western cats in recent years. The Persian or "Angora" long-haired breeds may probably have come from Pallas' cat of central Asia; and the curious Siamese cat is regarded as derived from the golden cat. The intermingling accidentally, or by the design of breeders, of these various species and races has produced the bewildering variety of forms now seen. Consult on this subject Ingersoll, 'Life of Mammals' (New York 1909, with bibliography).

American Interest in Cats.— American interest in the cat is often said to have originated within the last 20 years, that is, since the advent of exhibitions and the taking up of the cat-cult by the public. This impression is not borne out by facts, for we have exhibitors who have intimately studied cats, have bred and raised them, and have cared for them for over 60 years, and cat-shows were held in Maine between 1860 and 1870, even before the great exhibition instituted in London by the well-known animal painter, Harrison Weir, in the year 1871. But cat-shows in America were not known outside of Maine until one was held in the Madison Square Garden, New York, in 1895. The exhibitions in England have gone on from Mr. Weir's first show up to the present time, so that the marking epochs in modern cat history may be dated from the Crystal Palace show in 1871, and the New York show in April 1895. From these shows has arisen what may be described as a cult, or in some ways an industry. Numbers of individuals, principally women, have taken up the cat as a partial means of livelihood, selling those they rear by exhibiting them to the public, the outcome of which has been the production of different colors, strains and families. Clubs have arisen for the care and maintenance of exhibitions; registers and stud-books have been started; and the importance of cats of known pedigree is duly recognized by our government as one of the many things to be considered and provided for in a tariff schedule.

The varieties or breeds recognized in shows are the Persian, Siamese, Abyssinian and ordinary domestic short-haired cats. The Persian and Angora may be said to be the same cat, though distinctions were drawn in old days; but these were very indefinite, and at the present time we draw up rules and regulations for two large groups, the long-haired cats and the short-haired cats, and these are judged by points and classified by color distinctions. Angora is a small place, and comparatively few cats could have come from there, but many have come from other parts of Asia. Taking the long-haired division first, because commercially it is the most prominent, the judge requires that the cat shall be short in body with a short tail and short legs, the latter shorter in front than behind. The chest should be wide, the loin square and firm, the bones of the legs well delevoped and the frame sturdy. The head that corresponds with this formation and is required is a broad, round head with short, wide nose, eyes large and round and set well apart. The ears, a most important feature, should be as small as possible and placed on the side of the head, the base of the ear being narrow, not gaping wide open, with a tuft of hair at the apex. This standard is more or less based upon original imported specimens from Asia. The colors most valuable and most approved are the light silvers, smokes, blues (or slate color) white, black, orange, cream and tortoise-shells; and the tabbies of different colors are also favorites. The tabby cat is a cat that has a light ground-color and is spotted, barred or striped with darker color, and the word "tabby" has no reference to the sex of the animal. The name "tabby" is derived from Atab, a street in Bagdad celebrated for its manufacture of watered or moiré silks, which in England were called *atabi* or "taffety." The most usual colors in tabby cats are yellow, marked with orange or red, making what are called orange tabbies; yellow brown, marked with black, making the brown tabbies; gray, marked with darker stripes, giving us the gray tabbies; and pale silver, marked with black or a sort of dark blue verging on black, from which we have the silver tabbies. The great feature required in tabby cats is that the ground-color should afford as distinct a contrast to the stripes, bars or spots as possible; the colors should be vivid and the marks very plain. There are spotted tabbies, and in these the spots must be round, clear and distinct; but we seldom see a good one of this variety unless it come from India, the home of the best spoted tabbies. The solid-colored cats are the whites, blues, blacks and smokes; although recently the silvers, creams and oranges have in a few instances almost attained perfection in being without marks or foreign color. The tortoise-shell cats are black, red and yellow; when accompanied by white, the patches are clearer and distincter, and this feature is what is aimed at. Tortoise-shell males are almost unknown, and orange females are very scarce.

Points of Show Cats.— The eyes of a cat are an important feature, and should be large, round and pleasant in expression. Although color of eye is a great feature, many judges prefer large, well-placed, pleasant eyes to those that are more correct in color but badly placed, or are small and mean in expression, or give the cat a sour look. The color of eyes required may be briefly summed up as blue (as deep as possible) for a white cat; emerald-green for light silver or chinchillas, as they have been called; and yellow to orange, as deep as possible, for all other varieties. The color and beauty of the cat's eyes vary according to the state of health, the light and the time of day,

and judges have to be careful in this matter. The body-colors can be defined as white, as pure as possible; black, deep and glossy; blue or slate, sound and pure from root to tip of hair, showing no light shadings or light undercolor; smoke, a deep plum-color, silver undercoat, ruff and stomach; cream, light fawn or cream color; orange, whether marked or unmarked, should be as rich and strong as possible. The tortoise-shells marked with clear distinct patches, clean-cut and free from each other. The fur of the long-haired cats should be fine, long, silky and glossy; wooliness is deprecated, but is more inclined to appear in certain colors, such as orange and cream; and blacks may have a rather coarser texture of coat if they make it up in color. But in whites, silvers, blues, smokes and in brown tabbies there can be no excuse found for anything but exquisite quality.

In the short-haired division we must consider our old fireside friend first, and coloration in this variety is much the same as in the long-hairs, though we do not often find smokes or so many silvers, and the blue-eyed whites have probably been bred from the long-haired cats. But as to color, color of eyes and classification, the rules specified for long-hairs fit the short-hairs except that the tabby cats are more distinctly marked and more brilliant, as the colors are not clouded or mixed by the length of the hair. White cats with blue eyes are generally deaf, but not always. The short-haired cat is rather different in formation to the long-haired cat, the face is more angular, or rather the nose may come to a finer point, though its cheeks should be well developed. The eyes are differently placed yet should be full and large, the ears larger, closer together, more toward the top of the head, wider at the base and more pointed at the apex. The body should be moderately long, slender and elegant. The great thing to avoid in all cats is coarseness, and size alone is not a recommendation.

Foreign Cats Exhibited.— The Siamese is a distinct variety which comes from the palace of the King of Siam or from a few families of nobles. These cats are conceded to be the most intelligent and companionable of all cats, but having been much inbred are not easily reared and do not increase very fast. The climate of California suits the Siamese cat, and the variety is found there in fair numbers and doing well. The points valued in this cat are a rather small and flat head, a small and elegant body of a light fawn or biscuit color, with chocolate-colored legs, mask and tail. The more decided the contrast — that is, the lighter the body-color and the darker the points — the better. The Siamese are much appreciated as show-cats. Chocolate-colored cats of this variety are found and are valuable. The fur most approved is very fine and glossy, resembling beaver. The eyes are blue, the color as rich as possible.

The Manx cat makes a distinct species in our exhibitions, and is classed by itself. Besides the absence of tail, which is the distinguishing feature of this cat, a different formation of body is required; namely, that the fore legs should be short and the rump rise as abruptly as possible, making the hind legs longer than the fore legs, so that the cat seems to jump forward like a rabbit, and is sometimes called a rabbit cat. The head should be neat, round and rather small, and the cat itself small, short and compact. The Manx cat may be of any of the recognized colors. There is a distinction between this variety and our other domestic cats. Gambier Bolton who studied the question and traveled to collect specimens for the British Zoological Society coincides with the naturalist Kempfer, and recognizes a strong likeness in these cats to those of the islands in the East, the Malay Peninsula, Japan, China and lands contiguous. All the cats in those parts, even the Siamese, seem to have peculiar formations of the tail, whether cut short, forked, kinked or otherwise. These cats are smaller; there are differences in the call or language, ways and character, that have been observed by these students. The origin of the Manx cat is now attributed to the arrival of these cats on the Isle of Man from ships belonging to the Spanish Armada that were wrecked there. These cats were most probably previously brought from Japan or other parts of eastern Asia, for cats now brought from Japan are exactly like our Manx. A cat with his tail cut off, showing a stump, does not constitute a Manx cat for the student.

Other cats found in show-rooms are the Abyssinians, but they do not make much headway and have not yet arrived in America. The males are generally darker than the females, and the color of these cats should be a deep brown ticked with black, somewhat resembling the back of a wild rabbit, with a distinct black band running down the back to the tip of the tail. The inner sides of the legs and belly are more of an orange tint than the body, and are marked in some cases with a few dark patches. The eyes are deep yellow, tinged with green; nose dark-red, edged with black; ears rather small, dark-brown, with black edges and tips; and the pads of the feet are black. Attempts have been made to copy this cat, and it has been attempted to exhibit, as such, slightly marked, ordinary short-haired cats, but they are not the genuine breed. The absence of tabby-markings is the point most sought and prized, and if kept pure the characteristics of these cats are peculiar. The Abyssinian cat has never been very numerous at exhibitions, perhaps because it is a short-haired cat, though short-haired cats, when good exhibition specimens, bring large prices. Cats marked with white have not found much favor in British exhibitions, but have always been popular at American shows, and Madame Ronner, the great French painter of cats, usually depicts her cats — that is, the dark ones — with some white patches. If cats are marked with white, they are preferred with four white paws and a white face; that is, the white starting in a sharp point between the eyes, spreading out onto the lips, making a triangle with the apex on the forehead, and continuing thence down the chest, but not spreading to the shoulders or going round the neck or over the back. Any marking, in an "any other class," that is regular and even, and forms anything like a regular pattern, should be recognized and encouraged by a judge; besides which, any effort made to bring out a new variety or color must be taken note of and encouraged. There is now a tendency to encourage Dutch marked cats,

which means black patches on the cheeks, a white blaze up the face, joining a broad, white belt which goes completely round the cat halfway between the ears and tail.

Possibilities in Native American Species. — Of the cats indigenous to the American continent, which might be suitable for domestication, few have been tried in a domestic way, and the species that inhabit this country are not many. I have seen the wildcat or gray lynx, at shows, behaving in the most exemplary manner. Having been brought up from infancy by children, and perfectly tame, it was more at ease in a large show-room, and not nearly as nervous as the ordinary feline. So that if it were not for the size of the creature, its possibilities as a domestic animal would be good; but unfortunately our time does not seem to be destined to take in hand or give us any fresh species of domesticated animals; what we have are handed down through the ages. In this particular we are not original, for we destroy more often than we create, and we seem to have no time for trying to subdue or lead into bondage any new varieties of mammals. The puma, cougar or mountain lion ranges over the whole of North and South America, but is too large for domestic purposes; yet it has never been aggressive against man, and, if history is to be thoroughly credited, was quite the reverse with early settlers till driven to exile and filled with fear by man himself. The ocelot is one of our most beautiful varieties, and varies somewhat in color, with sometimes a gray body-color, but more often yellow. It is clearly marked with dark color in spots, bars and splotches, and is very handsome, but larger and more powerful than the domestic cat. These cats have been taken when young and reared; and although comparatively tame and sociable till about a year old, they then become savage and impossible and have to be caged or killed.

A very pretty cat that has been exhibited in America is the margay from Central and South America, where it inhabits the woods. This cat has been handled at an exhibition and found tame and with a passion for being caressed. The margay is light red or orange, beautifully and regularly spotted with small black spots, the ears small, round and pointing forward, whitish-gray at the backs, edged with black. It is a small cat, very handsome and refined, and if the effort could be made to obtain some more of the species these cats would be a very valuable addition to our varieties and to our home circles. Geoffroy's cat is another small spotted cat, of which a few have been introduced into England, but it is too early to state what the future increase may be. The pampas cat is another feline not amenable to domestic life.

Asiatic Races.— As a rule our best white cats with blue eyes come from India and some of the best are brought from Tibet. In crossing the Himalaya Mountains with these cats carriers slit their noses to enable them to breathe with greater ease the rarified atmosphere of the high altitudes. Cats with slit noses are much valued. As to cats coming from this place or that, such as Persia, Angora, etc., a good deal of proof is required before any particular claim can be accepted. The writer has failed to find any long-haired cats at Teheran, and Angora, as has been said, is but a small place. We probably obtained many of our long-haired cats from around the Persian Gulf, and more from India, many of which come down from the interior of Asia with the Arab horse-traders. Cats vary in their adaptability to changes of climate, and no doubt to this factor we owe what we have and what breeds we can retain and perpetuate. The Siamese soon succumbs to dampness, but the long-haired cats, in some cases, took to the climate of Maine early in the century, when brought from the East. They bred extensively, and increased and became an article of commerce to the large cities, long before these cities held shows. These cats went by the name of Angoras, and in fact the ordinary nomenclature of the country defines all long-haired cats as Angoras. The Maine cats were often carelessly bred, and when shows commenced and competition came they had to give way to the more finely bred English cats, but in other cases they held their own and the blood has been perpetuated. The Maine cats are found in all colors, and some are very big and strong, but these have been probably crossed with short-haired cats, and a great deal of hybridizing has been done even in England. There is a Russian long-haired cat, but it has not gained much favor, being solitary in its habits, unsociable in character, coarse in body and fur and dingy in color. A few have been brought from Persia, but they had the faculty of attaching themselves more to other cats than to their owners. They are originally the same cat as the Asiatic,— that is, the Persian or Angora; and the first long-haired cats must have been brought over by sailors and travelers from the East. All long-haired cats seem to have a common origin in Pallas' cat (*Felis manul*).

Another cat that has created a great deal of interest is the Maltese. This cat is hard to account for, but should be blue or slate in color and greatly resembles what in Great Britain is called the Russian or Archangel cat, specimens of which have often been brought from Russia; but lately quite an influx of blue cats has come from Iceland. Whether cold winters are calculated to develop blue cats I do not know, but it is sufficiently evident that northern climates have produced most cats of that color. Blue cats are not numerous in Great Britain, although they are becoming more so by introduction. Here in America we have plenty scattered all over the United States, but how they gained their name of Maltese the writer has been unable to discover, for there is no blue cat indigenous to the island of Malta. Probably the cats were brought there in early times from the same source whence the English now obtain theirs, and, the color being peculiar, these cats were selected or by superior hardiness they may have selected themselves. However many people who are not cat exhibitors or who do not know much about cats scientifically keep their short-haired blue "Maltese" and are proud of them. The Chartreuse monks had blue long-haired cats many years ago.

Temperament and Intelligence.— Some writers have told us that long-haired cats are less affectionate than short-haired cats. This is a mistake, although long-haired cats, on the average, are more intense, more nervous,

more highly strung, more pugilistic and have more pluck and daring than the short-haired cats. The cat has great intelligence; in fact, is one of the most intelligent if not the most intelligent, of the domestic animals, and it is this fact that precludes the possibility of teaching the average cat tricks. For the cat sees through the manœuvre, and refuses to be made a fool of. In respect to memory they are phenomenal and far exceed the average dog in this quality. Their powers of conversation are well developed, accompanied by delicate inflections of the voice that need to be known to be understood. Dupont de Nemours says: "The cat has also the advantage of a language in which the same vowels as those pronounced by the dog exist, with six consonants in addition, m, n, g, h, v, and f." It requires study to get to know cats, and Rouvière, the actor, said that no one could really understand a cat unless he himself became one. A cat, of all the domestic animals, has retained the greatest part of its wild nature and traits, and the easiest way to get at a cat is by kindness and by trying to learn cat ways. A cat never gives in to coercion. Liberty is the last thing it will resign; and often it will not resign that except in exchange for death. The cat should be used as the emblem of liberty.

It is a mistake to suppose that a cat cares only for places, for it is only the innate conservation of the animal that gives this impression. Regularity is the keynote of its existence and what it does one day it likes to do the next; and certainly to places where it has been reared and has lived it shows great attachment. But on the contrary there are cats that would settle down anywhere, that have crossed and recrossed the Atlantic Ocean, and have lived quietly in any locality their owners chose. A cat is one of the finest mothers on earth.

Cat-fanciers' Associations.— The fortunes of the cat are now more or less regulated by clubs and associations, and there are homes, hospitals and refuges in many places and in many lands. The principal clubs are the National Cat Club founded in 1887, with headquarters in London; the Scottish Cat Club, founded in 1894; the Cat Club, London, founded in 1898; the Northern Counties Cat Club, the Silver and Smoke Persian Cat Society, the Siamese Club and the Orange, Cream, Fawn and Tortoise-shell, founded in 1900; the Black and White Club, the Blue Persian Society, the Chinchilla Cat Club, the Short-haired Cat Club, the Midland Counties Cat Club, the British Cat Club and the Manx Cat Club, founded in 1901. All the above are in Great Britain, but many have members in America. In the United States there are the Beresford Cat Club, founded in 1899, with headquarters in Chicago; the Atlantic Cat Club, with headquarters in New York; the Chicago Cat Club, the Louisville Cat Club, the Pacific Cat Club, the Orange and Cream Society, with headquarters in Chicago, the Washington, D. C., Cat Club, the Detroit Club, etc. All these have been founded since 1899; so we can see that the advances made of late years have been sudden and rapid; and they will continue to grow; for shows are held in many of the principal cities and are yearly fixtures. Prices for cats increase; and whereas $25 was considered a good price a few years ago, some of the best have been recently sold for $250 each, and many at $75 and $100. The largest price of which we have record as having actually been paid in cash for a cat is $300, which was the price Lady Decies paid Mrs. Greenwood for Lord Southampton; although I expect to see this exceeded in time to come, for competition enhances values, and the best specimens and most perfect will bring high prices from those who want them. All this will tend to draw attention to the cat and better the race and its general conditions.

Cats have had their artists: the Egyptians, the Japanese, the Chinese, Salvator Rosa, Gottfried Mind ("The Raphael of Cats"), Burbank (a master little known), Cornelius Wisscher, the Dutch artist, whose "Tom" cat has become typical, J. J. Grandville, Harrison Weir, Louis Wain, Madame Ronner and Adam.

Members of the English royal family breed and exhibit cats at the regular exhibits of the present day. The Duchess of Connaught, the sister-in-law of the late King, was the organizer of the National Cat Club, one of the associations which maintains a thoroughly reliable studbook for cats; the Queen mother Alexandra herself is one of the active members of the Ladies' Kennel Club, and both Princess Christian and her daughter, Princess Victoria of Schleswig-Holstein, have taken many first prizes with their valuable feline pets.

A Few Hints to Breeders.— Do not try to keep too many; a good cat well reared will bring more money than 8 or 10 badly nurtured, undersized kittens. Cats are not gregarious, and when crowded together become diseased and mangy, and prematurely die. One litter of really good cats will give more pleasure and profit to the owner than five or six litters of poor ones.

Liberty is necessary to the health alike of the present and of the coming generations, and these latter should never be out of our minds when mating.

Meat is the main diet of all the *carvivora* to which order domestic cats belong. The best diet for cats is composed largely of meat, for which their teeth are adapted. Without meat they will not long remain healthy. They vary in their tastes, and what is fancied by one is not always preferred by another. Fish they are fond of, but as a rule house cats should not be given much raw fish. Cats kept in confinement should have grass, vegetables and changes of diet provided for them. Grass is a necessity.

Epidemics that sweep through different countries and continents at stated periods decimate the cat family, and it is well to be prepared for such occasions by having none but the healthiest and best of animals. Distemper, the greatest of cat scourges, is best treated by nursing, care and cleanliness. Fleas convey embryonic worms which infest cats, and should be rigorously kept down. They breed in cracks in the floor, in bedding and in the ground, and war waged upon their haunts will be work well laid out.

Do not use nauseating drugs for ailing cats, but choose the mildest remedies that will effect a cure. Do not be prejudiced against a course of treatment till you have tried it well; and remember that supposed cures suddenly made are not always effectual. Cats, when ill, require sympathy as much as human beings, and more so than any other animal, in order to battle successfully with disease, for they have a tendency

to be very pessimistic and sorry for themselves, and to recover or fail quickly. They suffer mostly from distemper, worms, eczema, bronchitis, pneumonia and liver diseases, and occasionally from catarrhal fever. If you are acquainted with a good homœopathic physician, and have any idea of what ails your cat, consult him and abide by his advice.

Do not breed from your queens too young, although many good kittens have been raised from queens not a year old, if strong and healthy. Male cats will not mate as early in life as the queens, and are seldom of much use till a year old. Do not cross long-haired cats with short-haired cats, for you spoil the type of both. Siamese cats will breed with other cats, but the progeny are never good for the show-room; and the Siamese being a distinct breed, does not amalgamate with any of the other varieties. The Manx cat is better kept pure, or the type degenerates and the result is not satisfactory.

Remember, when trying to rear good cats, that what goes in at the mouth and the care bestowed upon the young and growing animals cover 50 or even 75 per cent of essential requirements. The best blood in the world will not bring prize-winners or nice pets if they are badly reared. The crucial period takes in the first six months; when the young cat is well grown, and at seven months of age is through teething, you will have an animal that may live 20 years or more. Healthy cats are more long-lived than dogs, and authentic records tell of not a few over 20 years of age, and of some even 30.

Kittens should not be taken away from their mothers before they are at least eight weeks old; and if three months old, it will be still better. Care should be exercised in the diet of kittens at an early age. Sudden changes or sudden chills will bring on gastritis. Milk, unless pure, is more dangerous than meat, which in a raw state may be given scraped or minced at a very early age. Milk is better when mixed with Robinson's prepared barley according to the directions on the box, unless you can obtain warm milk from a cow that has not been too long in milk. The most dangerous diet for highly bred kittens is cold skimmed milk of an uncertain age.

To destroy a cat, or put it out of its misery when too sick to recover, administer a few drops of chloral, place the cat, if possible, in a tight box, and when the cat is fast asleep drop into the box a sponge saturated with two or three ounces of chloroform.

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Revised by ERNEST INGERSOLL.

CAT-BIRD, one of two kinds of birds. (1) In North America a familiar songster (*Galeoscoptes carolinensis*), so-called because of its mewing call-note, which is strikingly similar to the plaint of a kitten in distress. This, however, is not its only note, its wild and melodious warbling in the morning and the evening being also typical of the musical thrush family to which it belongs. It is about nine inches long, and of a dark slate color, with a black cap, and a reddish patch under the tail. It is migratory only in the Northern States, spends its winters in the South, and frequents bushy pastures and gardens, being one of the few species which follow the course of agriculture, and being rarely found far from the habitations of the farmer. It is of great service to the agriculturist in devouring wasps, grubs, worms and insects, which, with fruits and berries of all kinds, especially of sumach, sweet gum and poke, constitute its food. It has a brilliant and varied song, in which it seems to mimic the notes of other birds; when in a domestic state it will imitate strains of instrumental music. The nest, generally built in bramble thickets, is large, and constructed of twigs and briers mixed with leaves, weeds and grass, lined with dark fibrous roots arranged in a circular manner. Its eggs, from four to six in number, are of a greenish-blue color, without spots. Its attachment to its young is remarkable, and it will often feed and raise the young of other birds. It migrates during the night. It frequently attacks the common blacksnake, which, in the absence of the bird, rifles its nest. (2) In Australia, one of the bower-birds (*Ælurædus viridis*), so named because of its cat-like call.

CAT-BOAT, a boat having one mast stepped just abaft the bow and carrying a sail laced to a boom and gaff, resembling a schooner's mainsail. In general catboats are very broad in beam, averaging 1:3. They are usually equipped with a center-board, which, with the extreme forward position of the mast, enables them to point high into the wind, and makes them remarkably quick in stays. They are principally employed as pleasure craft on the coasts and inland navigable waters of the United States, and are consequently of shallow draft.

CAT ISLAND, one of the Bahama Islands, about 36 miles in length from north to south, and three to seven miles in its mean breadth. Pop. 3,000. This island was long identified with the Guanahani or San Salvador of Columbus, the first portion of land belonging to the New World on which he landed, 12 Oct. 1492, an honor now conceded to Watling Island.

CAT-OWL, any of several widely distributed large owls, so called because of their

feline habits and cat-like face; also, locally, the common little screech owl. The best known American cat-owl is the barred owl (*Strix varia*), one of the largest birds of its kind, large specimens reaching 24 inches in length. It has no ear-tufts, and the general color is whitish, everywhere transversely barred with deep umber brown, except on the abdomen, where the stripes run lengthwise. It is a lover of the woods, where its coughing cry resounds afar in the darkness, and where it breeds in hollows or among the branches of trees. It is not migratory, and often nests very early in the spring. This owl has the reputation of being especially destructive of poultry, but in truth it lives mainly on mice, of which it devours vast numbers each season, and hence is the benefactor rather than the marauder of the farm. Consult Fisher, 'Hawks and Owls of the United States.'

CAT-SHARK, any of various members of the *Scylliorhinidæ,* a group of true sharks which are characterized by having two dorsal fins, the anterior of which is placed over or behind the ventral, and by having the tail not bent upward. Some of these are called also "roussettes."

CATABANGENES. See CATUBANGANES.

CATACLYSM, in geology, a physical catastrophe of great extent, supposed to have occurred at different periods, and to have been the efficient cause of various phenomena observed in the surface configuration of localities. The belief in cataclysmic movements as geological agents has largely given place to that in the working of ordinary agencies over long periods of time.

CATACOMBS, subterranean caves or vaults used as burial-places. All nations have been accustomed to some outward manifestation of regard for the dead, such as funeral solemnities, the consecration of grounds for sepulture, the erection of monuments, etc. Some nations, as the Egyptians, constructed pyramids and labyrinths to contain the remains of the departed. Others, as the Phœnicians and after them the Greeks, hollowed out the rocks for tombs, surrounding their towns with vast magazines, containing the bones of their fathers. Asia Minor, the coast of Africa and Cyrenais, afford instances of these singular and gigantic works. The discovery of these monuments has always excited the curiosity of travelers and the attention of artists. The latter have applied themselves to learn from them the character of architecture and painting at different epochs; and though they have often found only coarse representations, the productions of art in its infancy or decline, they have occasionally met with types of perfection. Many monuments of this description have been preserved to our days, and still contain traces of the painting and architecture with which they were decorated. There are catacombs existing in Syria, Persia and among the most ancient Oriental nations. But the revolutions in these countries, and the changes which they have occasioned, have deprived us of the documents which would have given us exact information regarding them.

The description of the catacombs in Upper Egypt gives us an idea of those whose location is still unknown to us. They contain the history of the country, and the customs and manners of the people, painted or sculptured in many monuments of the most admirable preservation. The subterranean caves of these countries, like almost all of the kind, have their origin in quarries. From the depths of the mountains which contain them, stone was taken, which served for the building of the neighboring towns, and also of the great edifices and pyramids which ornament the land. They are dug in a mountain situated in the neighborhood of the Nile, and furnished the Romans with materials for the construction of buildings in their colonial establishments. The excavations in these mountains are found throughout a space of 15 to 20 leagues, and form subterraneous caverns which appear to be the work of art; but there is neither order nor symmetry in them. They contain vast and obscure apartments, low and irregular vaults, supported in different parts with piles left purposely by the workmen. Some holes, of about six feet in length and two feet wide, give rise to the conjecture that they were destined for sepulchres. Cells of very small dimensions, formed in the hollows of these obscure caverns, prove them to have been the abode of recluses.

In Sicily and Asia Minor a prodigious number of grottoes and excavations have been discovered containing sepulchres. Some appear to have served as retreats to the victims of despotism. The greater part are the work of the waters which traverse the mountains of these regions, as for instance the great cave of Noto, which passes for one of the wonders of Sicily. This cave, the height, length and breadth of which are equal, has been formed by the Cassibili River, which runs at the bottom, and traverses it for the length of 100 fathoms. In the interior of this cave are a number of houses and tombs. At Gela, on the south coast, there are abodes for the living and sepulchres for the dead, cut in the rocks; at Agrigentum subterraneous caves, labyrinths and tombs, arranged with great order and symmetry. There are also caverns in the environs of Syracuse which may be ranked with the principal monuments of this description, from their extent and depth, their architectural ornaments, and from some historical recollections attached to them. The catacombs in the tufa mountains of Capo di Monte, near Naples, consists of subterraneous galleries, halls, rooms, basilicas and rotundas, which extend to the distance of two Italian miles. Throughout there are seen niches for coffins (*loculi*) and bones. A description of them was given by Celano in 1643. They probably owe their origin to the quarries which afforded tufa for the walls of the cities Palæopolis and Neapolis, and afterward served as sepulchres for the Christian congregations.

The most numerous and extensive catacombs are those in the immediate neighborhood of Rome, at San Sebastiano, San Lorenzo, etc., the earliest of which of certain date belongs to the year 111 A.D. They are composed of interminable subterraneous galleries, extending underneath the town itself as well as the neighboring country, and are said to contain not less than 6,000,000 tombs. The name of catacombs, according to Saint Gregory, was at first applied to designate exclusively the cave in which the bodies of Saint Peter and Saint

Paul were buried, and it was only at a later period that it came to be given to all the subterraneous passages which were used as public burying-places. It is now regarded as certain that in times of persecution the early Christians frequently took refuge in the catacombs, in order to celebrate there in secret the ceremonies of their religion; but it is not less certain that the catacombs served also as places of burial to the early Christians, and that in spite of the contrary opinion which prevailed for two centuries, and even down to our day, the catacombs were not for the most part abandoned quarries, but were excavated by the Christians themselves. It is found that originally the cemeteries of Rome were made up of separate tombs, which rich Christians constructed for themselves and their brethren, and which they held as private property under the protection of the law. But in course of time this was changed. At the end of the 2d century there existed certain cemeteries not the property of individuals but of the Church. Such was that which Pope Zephyrinus (202–19) entrusted to the superintendence of Calixtus, and which took its name from that bishop. Some years later, under Pope Fabian (236–51), there were already several such common burying-places belonging to the Christian congregations, and their number went on increasing till the time of Constantine, when the catacombs ceased to be used as burying-places. From the time of Constantine down to the 8th century they continued to be used as places of worship by the Christians, but during the siege of Rome by the Lombards they were in part destroyed, and soon became entirely inaccessible, so that they were forgotten. The first excavations in them were made by Antonio Bosio between 1560 and 1600. The results of these excavations were published in his 'Roma Sotterranea' (Rome 1632), which was translated into Latin by P. Aringhi (Rome 1657). Among the more modern works on the subject may be mentioned Rochette's 'Tableau des Catacombes de Rome' (Paris 1837); Perret's 'Les Catacombes de Rome' (Paris 1851–56); and 'La Roma Sotterranea Cristiana' by De Rossi (Rome 1864–77), containing the results of very careful investigations made by the author, who is justly regarded as the foremost student, in fact, father of this branch of archæology.

The catacombs of Paris, situated on the left bank of the Seine, are almost equally celebrated. The name itself, which has been given to this labyrinth of caverns and galleries from its resemblance to the asylums and places of refuge of the persecuted Christians under Naples and Rome, informs us of the purpose to which it has been applied since 1786. These galleries were originally the quarries from which materials were excavated for constructing the edifices of the capital. The weight of the super-incumbent houses rendered it necessary to prop them; and when the cemeteries of the demolished churches and the burying-grounds were cleared in 1786, the government resolved to deposit the bones in these quarries, which were consecrated for that purpose. The first cemetery that was suppressed was the Cimetière des Innocents, and the bones from it were deposited beneath what is now Petit-Montrouge. The ossuary now extends much farther. The relics of 10 or more generations were here united in the repose of the grave. Many times as great as the living tide that rolls over this spot is its subterraneous population. By the light of wax tapers, a person may descend about 70 feet to a world of silence, over which the Parisian police keep watch as strictly as over the world of noise and confusion above. He will then enter a gallery where only two can go abreast. A black streak on the stones of the walls points out the way, which, from the great number of by-passages, it would be difficult for the visitor to retrace without this aid or without guides.

Among the curiosities here is a plan of the harbor of Mahon, which an ingenious soldier faithfully copied from memory, in the material of the quarries. Entering the hall, one is ushered into the realms of death by the inscription which once stood over the entrance to the churchyard of Saint Sulpice: "*Has ultras metas requiescunt beatam spem exspectantes*" ("Beyond these bounds rest those awaiting the hope of bliss fulfilled"). Narrow passages between walls of skeletons; chambers in which monuments, altars, candelabra, constructed of human bones, with festoons of skulls and thigh-bones, interspersed occasionally with inscriptions, not always the most happily selected, from ancient and modern authors, excite the gloomy impression which is always produced, even in the most light-minded, by the sight of the dissolution of the human frame. Wearied of these horrible embellishments, the visitor enters a simple chapel, without bones, and containing an altar of granite. The inscription "D. M. II et III Septembr. MDCCXCII" recalls to memory the victims of the September massacres, whose remains are here united. On leaving these rooms, consecrated to death, where, however, the air is always preserved pure by means of air-holes, the visitor may pass to a geological cabinet, formed by Héricart de Thury, the director of the Carrières sous Paris. Specimens of the minerals furnished by the regions traversed, and a collection of diseased bones, in a contiguous hall, scientifically arranged, are the last curiosities which these excavations offer. More than 600 yards to the east of the road to Orleans the visitor finally returns to the light of day. Strangers may visit the catacombs in company with the government officials at the periodical visits. An account of these subterranean passages is that which was published by M. Dunkel in 1885.

The Etruscan tombs were not, strictly speaking, catacombs, yet as subterranean places of sepulture they may appropriately be referred to. They were usually hewn out of cliffs on the sides of a hill and were variously arranged, sometimes tier above tier and sometimes on a level. There was a central chamber with smaller ones opening from it. In the latter there were stone benches to receive the bodies of the dead. See CATACOMBS, ROMAN.

CATACOMBS, Roman. The "Catacombs of Rome" is the name given to the underground cemeteries in which were laid to rest the Christians of the Eternal City during the first four centuries. The word itself seems to be a hybrid from the Greek *κατα* and the Latin *cumbere*, and signifies "next the sepulchres." It first came into use at the end of the 3d century as a topographical term for a point of the

Appian Way. In the course of time it was applied to the adjoining cemetery of Saint Sebastian, and in the Middle Ages, when the other cemeteries were forgotten, it became a general designation for all the early Christian burial-places at Rome. It was a word unknown, however, to the first followers of Christ, who called the sepulchres of the saints cemeteries, "places of sleep," owing to their faith in the Resurrection. There are some 32 of these larger early Christian cemeteries beyond the Aurelian wall, bordering the ancient Roman roads and encircling the city of the living with a silent city of the dead. The most important are the Catacombs of Priscilla on the Via Salaria, of Calixtus on the Via Appia, of Domitilla on the Ardeatina and the Ostrianum on the Via Nomentana. In this Roma Sotteranea there are some 550 miles of underground corridors, honeycombing the soil of the deserted Campagna and running like streets in all directions and at every angle, now near the surface and again descending to the depth of 75 feet, expanding here into a room and there into a crypt or chapel, along whose sides the faithful were buried in rows one above the other like the shelves of a shop or the bunks of a vessel. The corridors average about three feet in width and six feet in height and were dug generally in three or four levels, ranging from 30 to 50 feet below the surface of the soil. The niches, called *loci*, or *loculi*, which contained the bodies, were closed by a marble slab or a series of tiles, on which was frequently carved some inscription. To understand the origin of the Catacombs it is necessary to keep before our minds (1) the funeral customs and laws of Imperial Rome; (2) the early Christian mode of burial; and (3) the nature of the soil out of which sprung the famous seven hills. (1) The ancient Romans had a great reverence for their dead. *Religiosum locum unus quisque sua voluntate facit, dum mortuum infert in loco suo.* Wherever a body rested became *terra sancta*, sacred soil, subject to the authority of the pagan pontiffs. Hence burials were forbidden inside the walls, and the ways leading out of the city were lined from the first to the third milestone with the mausolea, whose richness was one of the glories of the Imperial City, as their ruins are one of the beauties of modern Rome. The pagan mausoleum consisted of three parts, the monument proper, the area or lot of ground and the underground vault in which the ashes were placed in dovecot niches, known as *columbaria*. These burial plots with their magnificent monuments were owned by burial societies as well as by families and were fully protected by the law. The Christians likewise, either singly or collectively, erected their mausolea along the highways beyond the walls, and this property, even in times of persecution, was safeguarded by the majesty of Roman law. Hence it often happened that while the law spilled the blood it spared the body of the Christian. The opinion sometime current that the bodies of the martyrs were buried by stealth, and that the pagan authorities were ignorant of the existence and extent of the Catacombs, is altogether unfounded. The Catacombs were registered under and recognized by the law. They enjoyed the privilege of sacrosanct soil. Indeed many of the bodies were interred in surface cemeteries as to-day. (2) The first faithful originated no special mode of burial. They generally followed the customs of the people among whom they lived. They adopted the Jewish practice of interring, instead of the Roman method of cremating, on account of their belief in the resurrection of the flesh. The sepulchre hewn in the rock, where the body of Christ was laid, was the resting place too of the Christian body. This was first wrapped in a tunic or winding sheet previously coated with a preparation of plaster, was covered with perfumes and flowers and placed in one of the niches cut out of the subterranean crypt or along the corridor. In the case of the martyrs or wealthier converts the bodies were laid sometimes in a marble sarcophagus or in an arched grave hewn out of the rock, termed *arcosolium*, and called *bisomus* or *trisomus*, according to number of bodies it contained. (3) The soil of the Roman Campagna is of volcanic origin and consists of three distinct sorts of tufa: (1) the lithoid tufa or peperino, a hard building stone; (2) the fine pozzalana sand used in making the Roman cement; (3) a granular tufa, of no commercial value. However this granular tufa was readily worked, and it is precisely in this stratum that we find the Catacombs. The workmen followed these veins in excavating, whence the apparent confusion of the courses and distance of the depths. It was thought at one time that the Catacombs, like the arenaria, were excavated for building purposes, but modern research has shown that they are of distinctively Christian origin and have nothing in common with the arenaria either in mode or material of construction.

Origin.— The genesis of the grave among the faithful at Rome was something like this. The wealthier Christians owned their burial lots along the public roads leading out of the city. They had their monument fronting the way, marked with the name of the family. This, for instance, was the case with "Sepulchrum Flaviorum" on the Ardeatine Way. The crypt beneath, instead of being fashioned into a columbarium, had the graves cut out of the soil. At first this crypt was placed at the disposal of the brethren of the *Ecclesia Fratrum*, and, as the number of burials increased, the crypt was gradually extended under the entire surface of the lot. Thus the Catacombs in the 1st and 2d centuries were little more than the private burial vaults of the wealthier Christian converts. These original centres of excavation have been recognized in many cases, as, for instance, the crypt of Lucina in Calixtus, the Greek Chapel in Priscilla and the *Spelunca magna* in Prætextatus. At the beginning of the 3d century the cemeteries passed from private to Pontifical control. About the year 197 Zephyrinus appointed the deacon Calixtus to take them in charge, and the latter has bequeathed his name to the best known of them, which became the official burying place of the bishops of Rome in the 3d century and contains the famous papal crypt. Henceforth the Catacombs were owned and administered by the Church. Each one of the 25 parishes in which ecclesiastical Rome was divided in the 3d and 4th centuries had, roughly speaking, its corresponding cemetery. The identification of the tituli and the cemeteries has been estab-

lished in a number of instances. With the increasing number of the faithful were formed burial societies among the brethren, which, like the pagan societies, provided by the payment of dues for the benefits of burial to deceased members. They owned their own lots, had their own houses built above the ground, in which they met to celebrate their agape and funeral feasts. Hence there was nothing incongruous in the Christians assembling at the Catacombs on stated occasions to keep the anniversary feasts of their martyrs. Similar celebrations were held by the pagans themselves, and there is a striking resemblance between the liturgy of these pagan funeral feasts and the language of the Roman martyrology. The inviolability of the cemeteries was undisturbed even in times of persecution, save by Valerian, in 258, and Diocletian, in 303. The part played by these burial societies in the Church is still in dispute. De Rossi has advanced the theory that the Church in the 3d century owned its property as a burial society, as *Ecclesia Fratrum* or *Ecclesia Cultorum Verbi*. Duchesne, however, contends that even in period of persecution, the Church was recognized as a religious society, capable of holding property. The work of excavating was under the care of a distinct class, called *fossores* or diggers. They were regarded as an inferior sort of clergy, and many of the rude inscriptions were made by them.

The Constantine Period.— It has often been said that the victory of Constantine brought the Church from the Catacombs to the cathedral. The reverse is literally true. It was precisely in the era of peace that the Church betook itself to the Catacombs and that they attained their largest growth and grandeur. Everyone wished to be buried close to the martyrs of Christ. *Quod multi cupiunt et rari accipiunt*, we read in an inscription of the year 381, of one who had obtained burial near the sepulchre of the saints. The crypts of the martyrs were changed into triumphal halls of fame. They were decorated with the choicest of marbles from the wealth of the Imperial City. New corridors and entrances were cut, the old ones were joined together. Metrical hymns of praise were placed above the graves of the chief martyrs, especially by Pope Damasus. Lights were kept burning before their shrines, and thither the devout of the city were continually flocking to implore the intercession of the saints or to honor their memory. Even the great Constantine basilicas of Saint Peter on the Vatican, Saint Lawrence on the Labicana, Saint Paul on the Ostian, Saint Agnes on the Nomentana, were but triumphal canopies erected over the tombs of these Christian heroes. Toward the end of the 4th century the custom of burying in the surface cemeteries began to prevail, and after the sack of Rome by Alaric, in 410, interment in the Catacombs ceased altogether.

Period of Decline.— In the succeeding centuries they were chiefly centres of devotion and terms of pious pilgrimages from the North. The itineraries of these pilgrimages from England and Germany, some of which have been preserved, were veritable Ariadne-clues in the rediscovery of these buried labyrinths. For some time the Popes of Rome, notably Vigilius (537–55), John III (561–74) and Honorius I (625–38) kept the shrines in a state of repair; but after the ravages wrought in the Catacombs by the invading Lombards, Paul I in 757 and Paschal I in 817 translated the relics of the martyrs to churches within the walls. Despoiled of the treasures which had attracted visitors, they rapidly fell into decay. With the exception of the Catacomb of Saint Valentinian on the Flaminian, and Saint Sebastian on the Appian Way, their very existence passed out of the minds of men in the Middle Ages.

Rediscovery and Research.— In 1587 some workmen, excavating on the Via Salaria, chanced upon a Catacomb corridor, rich in paintings and inscriptions. The interest aroused by this discovery has never since died out. Antonio Bosio (1576–1614), the Columbus of the Catacombs, devoted his life to their exploration. His 'Roma Sotteranea' is the first classic on the Catacombs. The researches made by Boldetti and Battari and others in the 18th century were mainly in the interest of controversy. To the Jesuit, Father Marchi, belongs the glory of having inaugurated, in 1841, a strictly scientific study of these early monuments and memorials, and the still greater glory of being the master of Giovanni Battista de Rossi (q.v.), the father and founder of the science of Christian archæology. By his genius and labors he explored and excavated the buried crypts and corridors of the Catacombs, established their identity and called them by name. From broken stone and damaged fresco and forgotten tomb, he gathered together the materials of a monumental Encyclopædia Romana, a storehouse of the treasures of early Christian belief and behavior.

Paintings.— In regard to the many paintings found in the Catacombs, it may be said in general that the history of the decline of Classic is that of the beginning of Christian art. In fact nearly all the examples extant of Roman paintings in the 2d, 3d and 4th centuries are in the Catacombs. They show us that the Church baptised the art as well as the language of the Græco-Roman world. While the themes treated for the most part have a direct reference to the grave and beyond, they still illustrate a large part of the creed of the early Church. The Catacomb frescoes belong to three distinct periods. In the 1st and beginning of 2d century, there was properly speaking no Christian art. The methods and motifs of the pagan painter, such as abound at Pompeii, vines, garlands, flowers, fishes, fruits, birds, cupids, etc., appear likewise in the Catacombs. However even among these designs, those that were capable of symbolizing some Christian truth, as the vine, peacock, dove and fish, predominate. In the 2d and 3d centuries, as the cemeteries pass from private to public control, a series of paintings distinctly Christian begin to appear. They are symbolical in meaning and similar in execution.

In the third epoch which corresponds to the time of peace, the pictures tend to become more and more realistic, until they are petrified in the 5th and following centuries in the rigid forms of Byzantine art.

The Biblical Cycle.— A remarkable parallel between the prayers of the Roman Breviary for the commendation of the soul in the hour of death and the Biblical Cycle of cemeterial paintings was first pointed out by Le Blant.

This correspondence is so exact as to leave little doubt that these paintings derive their inspiration from the funeral liturgies of the Church. The deliverance of Noah in the flood, of Isaac from the sacrificing hand of his father, of Daniel from the lions' den, of the three children from the fiery furnace, of Susannah from her false accusers, of Jonah from the whale, are the ever-repeated themes, and they all correspond to the liturgical prayers for the dying. The raising of Lazarus completes the Biblical Cycle, and this scene is the gospel for the Requiem Mass. Of this series Jonah and Lazarus are most frequently depicted. The designs are evidently symbolic. A man standing in a chest serves to recall Noah and the ark; the story of Jonah is often told in three scenes; the casting from the ship, the vomiting forth from the dragon fish and the resting under the gourd. But not infrequently the last scene alone is portrayed. In the same spirit the raising of Lazarus is depicted by a man standing upright at the entrance of a tomb.

Pictures of the Saviour.— There is no likeness of Christ attempted in the Catacombs. He is represented by the symbol of the fish and the hidden cross. The fish, in Greek, *ἰχθύς* formed the famous acrostic *Ἰησους Χριστος, Θεου Υιος Σωτηρ* (Jesus Christ Son of God, Saviour) and whether written or pictured was a mystic symbol of the Saviour. The transpierced dolphin in Calixtus is the earliest copy of the Crucifixion. The disguised cross was also of frequent use, and never has this sign been in higher esteem than in the first ages of the Church. It was sometimes represented thus ☓; again as an anchor ⚓, now as the gamma cross ⌐, at other times as a trident Ψ. The Constantine monogram ☧, so called from its use on the Labarum, was the common symbol of the 4th century. It was used even in inscriptions, as *in nomine* ☧ or *in pace* ☧. This ☧ was the early monogram of Christ, as IHS became the later one, of Jesus. There was no real representation of the Crucifixion till the Middle Ages. The Crucifix is the creation of the ages of faith, and not of the formative period of Christianity. The first pictures in the Catacombs represent Christ as young and beardless, but in the 5th century the Byzantine bearded face with severe features came into vogue. The picture of the Good Shepherd is the Catacomb Christ par excellence. It is found everywhere in the frescoes of the 2d, 3d and early 4th centuries. The Saviour is represented in the garb of a young Roman shepherd, wearing the short sleeveless tunic, his right shoulder bare, his feet and legs sometimes bare, again covered with shoes and leggings. In some scenes he carries one of the flock upon his shoulders, in others he plays the pipe while they listen, in others still he leads them to pleasant pastures, but always and everywhere it is the Good Shepherd who seeks and saves. This picture of love was the reply of the Roman Church to the harsh doctrine of the Novatians in the 3d century.

The Saints.— Most of the pictures of the martyrs belong to the 4th, 5th, 6th and even 7th centuries when their graves became shrines, and were richly decorated. They are Byzantine in execution and resemble the mosaics of that period. They are valuable as witnessing the style of vestments worn by ecclesiastics of the day. The Virgin Mary appears most frequently in the Catacombs as the central figure in the Adoration of the Magi. These vary in number from two to six, but uniformly wear the Phrygian cap. The two most interesting pictures of the Madonna are in Priscilla and Ostriano. The former is a 2d century representation of the Virgin with child in her arms, with a prophet in front of them, pointing to a star. It is a picture of much grace and excellent execution. Its classic lines do not appear again in Christian art for more than a thousand years. The latter is a 4th century Madonna and child, where the ☧ is placed on either side, as though it were a painted echo of the Council of Ephesus. The divine maternity of Mary was certainly in the mind of the artist, and the features of this painting are still preserved in Greek and Russian images. The saints are sometimes portrayed as "advocates" introducing into heaven the souls of those whose bodies were buried near their shrines. This ministerial mediatorship of the saints, exhibited in the Catacomb frescoes of the 3d and 4th centuries, became a common theme of the apsidal mosaics of the basilicas.

The Soul.— The soul is frequently represented by a young woman standing with arms outstretched in an attitude of prayer, called the *orans*. In paradise the soul is depicted as a bird flying among the flowers or feasting on the fruits or drinking from the chalice of heavenly delights. The celestial banquet is represented some six or seven times in Saints Pietro and Marcellino by the blessed seated at a semi-circular table, feasting upon the mystic fish under the guidance of Peace and Charity. The judgment of the soul standing before Christ in the presence of the martyrs seems to be the subject of some obscure frescoes.

The Sacraments.— In the cemetery of Calixtus are a series of so-called Sacrament chapels, where the decorations are arranged to set forth a number of Christian truths. First, comes the scene of Moses (Peter) striking the rock. "And the rock was Christ." (1 Cor. x, 4). In the mystic water of grace a small fish is being caught by the Apostolic fisherman. Tertullian has painted the thought in words. "We as little fish are born in the water after our *ἰχθύς*, Jesus Christ." (Tert. de Bapt.) Then succeeds the Sacrament of Baptism, the source of the new life. The catechumen stands in the water, and the priest pours the laver of regeneration on his brow. Next follows the Eucharistic action, portrayed by a priest standing beside a tripod altar containing a fish and some bread, while an *orante* at the other side lifts her hands in prayer. The multiplication of the loaves and fishes and the banquet of Christ with his disciples by the sea of Tiberias next represent the Communion. And finally the resurrection as a result of the Communion is shown in the raising of Lazarus and the deliverance of Jonah. "He that eateth my flesh and drinketh my blood hath life everlasting, and I will raise him up on the last day." (John vi, 55). There are two representations of the Eucharist worthy of remark. In the crypt of Lucina, the primitive centre of Calixtus, there are two frescoes (about 150 A.D.), in which two large fish carry on their back baskets containing bread and wine. Here Christ, the fish, the *ἰχθύς*, bears the Eu-

charistic bread and wine, which is himself. Saint Jerome would seem almost to speak of this scene: «No one is so rich as he who carries the body of Christ in a wicker basket and his blood in a cup of glass» (Ep. ch. xxv ad Rustic). Another painting of the first half of the 2d century, discovered by Wilpert (1894), in the archaic part of Priscilla, the Capella Græca, seems to be a real representation of the Eucharistic action of the «Breaking of the Bread.» Seven persons, one of them a woman, are seated at a semi-circular table, on which are two plates with five loaves and two fishes. These, however, are evidently symbolical, for the priest at the head of the table is engaged in the very act of breaking the bread, and before him sits the Eucharistic chalice. This fresco is in a chapel, and seems to be an early representation of the Eucharistic sacrifice. The representations of the other Sacraments are rare and of doubtful interpretation. A general survey of these paintings leads to the conclusion that the early Christians saw nothing in religious representations hostile to the law of Moses; that the early Church had no repugnance to art, and that the art of the Catacombs is Roman and not of Oriental origin. Mgr. Joseph Wilpert has just published an accurate and complete edition of the 'Pictures of the Roman Catacombs' with German and Italian texts (Rome 1903).

Sculpture.— Christian sculpture barely existed before the 4th century. Catacomb conditions were not favorable to its growth. A fresco could easily be painted in the gloom of the grave, but carved marbles were both expensive and required light and space for execution. Moreover the sarcophagi in the pagan shops were often covered with idolatrous scenes. Some of these have been found in the Catacombs with the pagan images effaced. With the era of peace, however, the faithful began to use sculptured sarcophagi, and a number of them are preserved in the Lateran Museum. As far as workmanship is concerned, they are of inferior merit, being executed at a time when art had greatly degenerated. Some of them are little less than carved creeds, containing on their façade the main mysteries of the Christian religion. They shed much light on the earlier paintings. The clear carving of the 4th and 5th centuries illumines the doubtful fresco of the 2d and 3d. In the sarcophagi, it is Peter striking the rock and Peter to whom Christ gives the law. Hence in the earlier paintings Moses typified Peter. Daniel among the lions on the sarcophagi is evidently Christ on the Cross. Hence we have a key to the early representations of this scene.

Statuary.— But few pieces of statuary have been found in the Catacombs. While idols were on all sides, the faithful seem to have held aloof from this branch of art. However several statues of the Good Shepherd were executed, and one of the 3d century preserved in the Lateran is a most beautiful representation of the subject. The sitting statue of Hippolytus of the first part of the 3d century, found in the cemetery of his name, is unique among early monuments. It contains inscribed on the cathedra a list of his works and his computation of the Easter Cycle.

Gold Glasses.— The gold glasses of which many have been found in the Catacombs consist of a design made of gold leaf, enclosed between two pieces of glass, ordinarily at the bottom of the glass. The subjects treated in these glasses of the 3d and 4th centuries are of two classes. Some of them are genre pictures, ornamented with the portraits of a newly-married couple of a family group, and inscribed with such toasts as «Drink! Live!» They were probably gifts for wedding and family feasts. Others used probably in the liturgical functions and perhaps as Eucharistic chalices were ornamented with the ordinary Catacomb cycle of paintings, but especially with the images of the Saints. Peter and Paul, Agnes and the Virgin Mary are the subjects most frequently represented. Eighty out of the 300 published by Garuicci portray Saints Peter and Paul. The constancy of the types, their correspondence with tradition, and the medallion of the same characteristics found in Domitilla and attributed to the early part of the 2d century, indicate that these are portraits of the Princes of the Apostles.

Mosaics.— There are but few mosaics in the Catacombs, and most of these are of the age of peace. The mosaic is the distinctive Christian decoration of the basilica of the 5th and 6th centuries, as the fresco was of the Catacomb in the 3d and 4th.

Lamps.— The common clay lamp is the object most frequently found in the Catacombs. Most of them are in no respect different from those used by the pagans. However in the 3d and particularly in the 4th centuries, they were marked with the Christian emblems of the fish, the Constantine monogram, the Good Shepherd, the palm, etc. They illustrate the way the Christian faith entered into domestic life after the advice of the Apostle: «Whether you eat or drink — do all to the glory of God.» (I Cor. x, 31). The wine flagon and the wine cup, as well as the lamp and the loaf, were stamped with the sign of the cross in the 4th and 5th centuries. The few bronze lamps unearthed are of much more elaborate workmanship and symbolism.

Other Objects.— Rings, seals and coins adorned with the characteristic symbols of early Christian art have been found frequently in the excavations, as well as a number of miscellaneous objects, such as children's toys, combs, etc.

Inscriptions.— The numerous Catacomb inscriptions are of the greatest interest to the Christian scholar. The most precious of them have been arranged in the Lateran Museum by De Rossi. The bulk remains yet in the Catacombs and in the gallery of Christian inscriptions at the Vatican. They may be divided according to the method of execution into carved, painted and «graffiti» inscriptions, the latter being writings rudely scratched on the plaster or tufa; according to time, into the original epitaphs and later laudatory inscriptions; according to language, into Greek and Latin; according to content, into dogmatic and domestic. Many of the tombs are without any inscription whatsoever, and many more are distinguished but by a rude mark or some object pressed into the fresh plaster. As a rule the early epitaphs are the shorter, although brevity is a distinguishing trait of Catacomb epigraphy, in marked contrast to the lengthy pagan eulogies of the time. The name of the

departed, with a short prayer and some symbol as the fish, palm, anchor or Constantine monogram, to which were sometimes added the date of burial and age, forms the ordinary inscription. "Gerontius, may you live in God," "Lucilla in peace," are characteristic epitaphs. The word "deposition" is peculiar to Christian epigraphy, implying that the body is consigned but for a time to the soil. The short prayers and symbols on the tombs are in general but a reproduction of the "Memento of the Dead in the Mass," *Ipsis, Domine, locum refrigerii, lucis, et pacis, ut indulgeas, deprecamur,* "Refreshment, light and peace grant to them, O Lord." This is the requiem chanted and carved in the Catacombs. Despite the fact that the inscriptions are sepulchral, they yet contain much matter of dogmatic and historic interest. They express belief in the unity and trinity of God, in the divinity of Christ, in the Holy Spirit, in the resurrection, and almost every article of the creed is carved on some monument. Especially strong is the testimony of the Catacombs to prayers for and to the dead. Both are sometimes found in one inscription, as this from Domitilla:

VIBAS
IN PACE ET PETE
PRO NOBIS.

"Gentianus,—pray for us because we know that thou art with Christ," we read in another. "Holy Martyrs, remember Mary," comes from Aquileia. *Januaria bene refrigera et Roga pro nos.* This last inscription from Calixtus is a fair sample of Catacomb Latinity. It is ornamented with a small box, containing the rolls of the law, the customary representation of the Bible in early Christian art.

Papal Crypt.— The inscriptions of the crypt where the Popes of Rome were interred in the 3d century are of peculiar interest.

ΑΝΤΕΡΩΣ Δ. ЄΠΙ ΦΑΒΙΑΝΟΣ · ЄΠΙ · ΜΡ

These inscriptions show that Greek was still the official language of the Church in the 3d century. The monogram Mr, martyr, was the official canonization of the Catacombs.

Damasene Inscriptions.— Pope Damasus (304–85), the first Christian archæologist, embellished the tombs of the martyrs with a series of metrical inscriptions, carved on large slabs of marble by his secretary, Furius Dionysius Filocalus. The texts of 40 of these are preserved in the ancient itineraries, and many of the original slabs have been discovered in the excavations of the last 50 years. The inscription of the papal crypt was found broken in 125 small pieces, which, when joined together, gave the entire text. Of all these inscriptions, but a fragment of the title at the tomb of Pope Cornelius remains in its primitive position, so thorough was the work of the devastating Lombard and destroying time. The tomb of Damasus himself, so long sought by the archæologists, was discovered at the close of 1903 by Monsignor Wilpert. The work of excavating is still going on, but enough data have already been dug from the depths to make it certain that whoever would go back to Christ must pass through the corridors of the Catacombs. Here he will find the mind of the Master in the might of the Martyr, and the love of the Saviour in the liberty of the slave. Here he will find Church and Sacrament, rite and ritual, creed and deed. Here he will come upon a society, Catholic in composition and in charity, Christian in faith and in hope, sleeping the sleep of peace and awaiting the resurrection of the flesh in ×. The scientific study of the Catacombs has shown that the Christians were numbered in Rome by tens of thousands in the 3d century. "We are of yesterday yet we fill all that belongs to you; we leave to you only your temples." The rhetoric of Tertullian is the reality of the Catacombs. The researches of De Rossi have shown, too, that the acts of the martyrs have much more historical value than the critical school of history was formerly inclined to give them. Further and fuller research will act as *luminaria* to dissipate the darkness which controversy has gathered round the Catacombs. And when the treasures of Roma Sotterranea are all unearthed, should all other witnesses of the faith once delivered to the Saints become silent, the very stones of the Catacombs will cry out to the world the wisdom and grace of Christ.

Consult Lowrie, 'Monuments of the Early Church' (1901), which gives in an appendix the best Catacomb bibliography accessible to the English reader.

WILLIAM TEMPLE,
Formerly Professor of Philosophy, Saint Joseph's Seminary, Dunwoodie, N. Y.

CATACOUSTICS, kăt-ą-koos'tĭks or -kows'tĭks, the science which treats of reflected sounds, or that part of acoustics which considers the properties of echoes.

CATAFALQUE, kăt'ą-fâlk, an ornamental structure, in the form of a scaffolding or stage, for temporary use at ceremonious funerals. On it is placed the coffin containing a body lying in state, as in a church or other public edifice, and it is sometimes used as a hearse, or set, as the representation of a tomb, over a grave.

CATALÁ, Valentín, Cuban poet: b. Havana, 3 May 1829; d. Havana, 7 Sept. 1877. He studied medicine in Paris and practised his profession there and in Barcelona. Later on he returned to Havana where he graduated in pharmacy in 1868. He had already given considerable attention to literature while in Europe; and almost immediately, on his arrival in Havana, he began to write for the Cuban press under the *nom-de-plume* of "Claudio," and sometimes under his own name. The two principal journals to which his contributions were made were *La Prensa* and *Cuba Literaria.* He was a prolific writer and, like most newspaper men, careless of his literary offsprings; so, much of his best work is still buried in the files of the Havana papers. Among his works which have been collected and issued in book form are 'Higiene de los Literatos'; 'Noches de insomnia'; and 'La dalia negra del cementerio de Gïunes.' The 'Noches' is a collection of poems, and 'La dalia' a legend. Catalá's work displays considerable originality and command of language.

CATALAN, a native of Catalonia (q.v.) and certain other parts of northeastern Spain. For the language of Catalonia see CATALAN LANGUAGE AND LITERATURE.

CATALAN FURNACE, a blast furnace for reducing ores, extensively used in the north of Spain, particularly in the province of Catalonia. It consists of a four-sided cavity or hearth, which is always placed within a building and separated from the main wall thereof by a thinner interior wall, which in part constitutes one side of the furnace. The blast-pipe comes through the wall and enters the fire through a twyer which slants downward. The bottom is formed of a refractory stone, which is renewable. The furnace has no chimneys. The blast is produced by means of a fall of water, usually from 22 to 27 feet high, through a rectangular tube, into a rectangular cistern below, to whose upper part the blast-pipe is connected, the water escaping through a pipe below. This apparatus is exterior to the building, and is said to afford a continuous blast of great regularity; the air, when it passes into the furnace, is, however, impregnated with moisture.

CATALAN GRAND COMPANY, The, a name of a troop of adventurers raised by Roger de Flor about the beginning of the 14th century. Roger first gave his services to Frederick, King of Sicily, in his war with Robert, Duke of Calabria, but when peace was concluded between the two princes, being at a loss how to maintain his soldiers, he proposed to lead them to the East to contend against the Turks, who were then desolating the Eastern empire. Andronicus, then Emperor of the East, gladly accepted the offered assistance of Roger, and submitted to all the conditions which he imposed. Roger set sail from Messina, Sicily, in 1303, with 26 vessels partly equipped at his own expense. The number of the troops embarked with him is said to have amounted to about 8,000 men of different nations, Sicilians, Catalans, Aragonese, etc. The Catalans, either because they were the most numerous or for some other reason, gave their name to the whole company. On his arrival at Constantinople Roger was received with great rejoicings, and was elevated to the dignity of grand duke. A bloody affray between the Genoese and the Catalans marked the first period of the stay of these adventurers in Constantinople. Andronicus hastened to get them to cross over into Asia. This they did in the spring of 1304, and in the same year they defeated the Turks completely. In 1305 he took Ancyra and forced the Turks to raise the siege of Philadelphia, but he was not so successful in his attempt to take Magnesia. After a long and ineffective siege he recrossed into Europe in 1306, bringing along with him his Catalans, who left behind them everywhere traces of their plunder and violence. When they had reached Europe they took up their quarters at Gallipoli. But Andronicus, who was by this time very anxious to be rid of his formidable allies, now received Roger with great coldness, and even obliged him to give up his title of grand duke in favor of Berengarius. The sudden departure of Berengarius, however, and the simultaneous incursions of the Turks into Asia Minor, compelled Andronicus again to appeal to Roger and his Catalans for assistance. Roger was raised to the dignity of Cæsar to appease him for the slights that had been put on him. But this only caused him to be regarded with more jealousy by the Greeks, and especially by Michael, the son of Andronicus, who was associated with his father in the empire. The result was that before he could start once more for Asia he was assassinated (1306 or 1307). The Catalans now turned their arms against the Byzantines, in order to avenge the death of their leader, and defeated them in several battles. They then passed into Greece and entered the service of the Duke of Athens, but no long time afterward they turned against him and defeated him in the battle of Cephissus (1311). They now became masters of Attica, where they maintained themselves for four years, when they were finally defeated by Philes near Bizyn (1315). Consult Gibbon, 'Decline and Fall' (Chap. LXII).

CATALAN LANGUAGE, one of the groups of the Romance tongues which has been considered politically in Spain as but a dialect of Spanish. It is, however, as distinctly different from Spanish and the other Romance languages as is Portuguese. Catalan was long the language of an independent kingdom; and the influences under which the Latin language passed in Catalonia and the other districts where the ancient Catalan was spoken were quite distinct from those of the other countries of Roman conquest. And it is these influences which have made the Catalan tongue. Modern Catalan seems to be a mixture of the ancient language spoken on the west coast of Spain and the north of Italy on the coming of the Romans for the first time to the Iberian Peninsula, and the Latin of the lower class of Italy influenced in a literary way by classical Latin. But Catalan has come under other influences. The Phœnicians, even before the arrival of the Romans in Spain, carried on a trade of some considerable extent and importance with the west coast of Iberia, the people of which, we are told, had attained to considerable civic organization and had important cities in many parts of their territory. It has been claimed for the people of this region, with some show of reason, that they were of the same origin as the Romans and that they spoke a Latin tongue, which differed, however, very widely from that of the Italian Peninsula, which was itself divided into widely different dialects. Others claim that the Catalonians were of Phœnician origin, or that the country had been populated from Carthage, and that therefore the original language of the east coast of the peninsula was Carthaginian. According to various other accounts of their origin, they came variously from Palestine, Greece, Britain, central Asia or even Mongolia. Still others have claimed for them a Celtic origin common with that of the other Celtic inhabitants of various parts of Europe.

Thus there is no certainty as to the origin of the ancient inhabitants of Catalonia. But that their language persisted throughout the Roman occupation of their country seems certain, during which period it continued to amalgamate with that of the Latin soldiers. If the ancient Catalan were really a Latin tongue which had gone the road toward the formation of an analytic language, the rise of modern Catalan soon after the disappearance of the Roman power about the beginning of the 5th century would be easily explained. But

this ancient tongue would have to have been dialectically decidedly different from that of the Italian Peninsula.

Catalan is spoken in a part of France bordering on Spain, in the greater part of the Pyrenees Orientales, Barcelona, Lérida Tarragona, Gerona, Valencia, Alicante, Castellón de la Planta, a part of Sardinia and the Balearic Islands. It has also had a strong influence on the pronunciation of the Spanish spoken throughout the Latin American countries, notably in Cuba and some parts of Central America. While Catalan was strongly influenced by Provençal in a literary way, the language of the people of Catalonia and adjacent territory resisted this foreign and unnatural influence. The result was somewhat curious. Catalan poetry, strongly influenced by the Provençal troubadour, reflected the Provençal mode of thought and form of verse, while Catalan prose, which at first was not looked upon as worthy the name of literature, is instinct with Catalan genius and racial feeling, idiom and point of view. This is one of the best proofs of the artificiality of the Provençal influence in Catalonia and of the unfoundedness of assertion that Catalan was nothing more than a variation of Provençal. Catalonia, owing to the fact that it came into contact, at such an early period in its history, with the Phœnicians, Carthagenians, Romans, British, Celts, Greeks and probably other races, and that it was later conquered or partially conquered by Romans, Carthaginians and Goths, assumed a mixed character. This was accentuated, in the first half of the 8th century, by the very considerable foreign population which had flowed into the country for commercial and other purposes. At this time the population of Catalonia was made up of the ancient native stock, Latins, Greeks, Arabians, Chaldeans, Hebrews, Celts, Valencians, Cantabrians and people from other parts of Spain. Business seems to have been carried on in the Catalonian country, or more properly speaking, where the Catalonian tongue or some dialect thereof was spoken, that is, all along the east coast of Spain, from Alicante to Genoa, and over most of the adjacent islands. And it was undoubtedly during this protracted trading period that the Catalan language assumed more or less definite form. Certainly by the 9th century it had become a strong independent language spoken over all the country already indicated. It had discarded Latin grammar, if it had ever had it as a part of the tongue of the masses, and had assumed all the earmarks of a living, aggressive, popular language. There can be no doubt that Catalan existed apart from Provençal, as the speech of the masses of Catalonia and the countries where Catalan is still spoken; for we find the writers of the later period of Provençal influence in Catalonia conforming to the popular and court usage of the age and writing poetry in Provençal and prose in Catalan. Moreover, when the Provençal influence was suddenly removed, after domination of considerable time, the native Catalan sprang up fresh and vigorous as the medium for both prose and poetic expression.

The people of Catalonia have ever shown strong individuality. When they first came into contact with Carthaginians, Greeks, Romans and other civilized races they were given to agriculture, commerce, industry and the sailing of the sea. So venturesome were they that they had coasted out through the Strait of Gibraltar and down the west coast of Africa before Cæsar had visited England. This strength of character they showed in their stubborn retention of their native tongue long after the greater part of the rest of the Iberian Peninsula had adopted Latin. Cicero states that, in his day, which was some considerable time after the conquest, the Catalonians possessed and used a distinct language of their own. This is all the more strange since the other parts of Spain came much less into contact with the Romans than did all the east coast of the peninsula. We are also told that the Catalonians spoke different dialects in different parts of their own country. This is born out by the fact that even to-day there is a considerable variation in the Catalan speech throughout the extensive territory in which it is spoken. If we are to judge from the remains of early Catalan literature of the popular kind and the distinct difference between the pronunciation of Catalan to-day and that of the districts where Provençal had its home, it is more than doubtful if Provençal, even in the days of its popularity in Catalonia and Valencia, was ever understood by the masses of the people; or by anyone except the nobility and the followers of the court, who through intermarriages and other relationships, had made of Provençal a common tongue for Valencia, Catalonia and the Provençal country. It was, therefore, in a sense, artificial. This explains why Provençal, after it lost its literary influence in Catalonia and Valencia, dropped suddenly out of sight, while the native tongue came out from its literary retreat, vigorous and individualistic, capable of expressing all the needs and aspirations of a distinctly individual people. Even at the date of the earliest Catalan manuscript it has every evidence of being a distinct tongue with fixed grammatical and other forms; and soon afterward there sprang into existence Catalan grammars, dictionaries and a large body of distinctive literature; and from this and a later period there survive many manuscripts and printed books; so that the comparison of Catalan with the other Hispanic languages is rendered easy.

One of the distinctive features of Catalan which distinguishes it from the other Hispanic tongues is its tendency to suppress many of the consonant and unaccented vowel endings so common in Spanish. Thus the Spanish hombre, man, becomes hom in Catalan; ciudadano, citizen, becomes ciudadá; bueno, good, bo. There is also a tendency to other contractions not seen in Spanish. Catalan had early become an analytical language and had thrown overboard all Latin declensions and other forms peculiar to Latin grammar. Catalan has its own distinctive accent and rough throat sounds different from the other dialectic forms of Spanish. The Catalan speaks very fast, and this combined with his cutting of the Latin final vowel forms (except a) makes it difficult for even the Spaniard to understand him when he speaks Spanish. In Catalan the absence of noun declensions is noticeable; and there is a tendency to strongly accentuate z between vowels; the Latin u is never modified as in French and the Provençal au becomes o.

Finally the b and v are kept distinct. Consult Baellot y Torres, 'Gramática de la lengua catalana'; Jubert de Passa, 'Recherches historiques sur la langue Catalane.'

JOHN HUBERT CORNYN,
Editorial Staff of the Americana.

CATALAN LITERATURE, the literature of Catalonia and adjacent districts speaking the same form of the Romance tongues. It had its origin in the movement started by the troubadours who overran Catalonia, Valencia and Provence, and it attained its highest development in the 14th and 15th centuries. The literature of Catalonia and Valencia is, therefore, closely related to that of Provence, and the two may be said to be practically the same development of the Latin tongue subject to different influences. The former is naturally divided into three distinct periods, the first of which embraces the history of the Catalan literary movement from the first appearance of Provençal influence to the early part of the 13th century. Catalonia was closely united to the Latin-speaking people across the Pyrenees by origin, interests and customs; and the influence of Provence, which had early felt the literary movement, became supreme. But under Jaime I the Barcelona dynasty set itself to develop the national spirit of Catalonia with success. This first period of Catalan literature, therefore, was naturally Provençal in character. Troubadours were to be found all over Catalonia as they were first in Provence and later all over France and most of Spain. Up to the coming of this exotic influence there had been no native literature in Provence, unless it may have been popular songs which, if they ever existed, have altogether disappeared or become so mingled with the Provençal literature as to be undistinguishable. But though the Provençal forms dominated the Catalan literature during this first period there are signs that the Catalan spirit was beginning to assert itself. The form is Provençal, but much of the spirit of the literature is native in forms of expression, modes of thought and subject of poetical effort. Count Berenguer, toward the end of this Provençal period, thinks like a Catalan; and through his troubadour poetry march Catalan thought, characters and customs proclaiming the coming of a national literature. Yet his work is still Provençal. Other Catalan writers, toward the close of the 12th century, show the same influence. The rugged spirit of Catalonia had begun to assert itself over the more effeminate Provençal.

The Rise of Catalan.— About the beginning of the 13th century the Provençal influence begins to give way before the new Italian literary domination which was ultimately destined to sweep over all the Latin countries. Catalonia and Valencia, lying close to Italy and being in constant touch with it, soon came under the influence of the new Italian literary revival; and imitations of the Italian poets became the order of the day. Renascent Provençal worshipped at the shrines of Boccaccio, Dante and Petrarch, while still casting loving glances to the Laws of Love and the Romance of the Rose. In Catalonia and Valencia the floral games became an institution patronized alike by sovereign, nobles and the many dabblers in literature who seem to have literally overrun the land. At these games poets contested for prizes and kings graciously and proudly awarded them. Among these contestants for poetical honors were many men bearing the highest titles of nobility; for literature was fashionable in Catalonia and Valencia, where even the sovereigns themselves aspired for honors higher than their royal distinctions. Under the influence of the powerful personality of Jaime I, himself one of the most distinguished of the native writers of his age, the exotic Provençal gave way rapidly to the customs and beliefs of Spanish and Catalan; and under the king's patronage, encouragement and example the Catalan speech rose into a national language and created a national literature. One of the most noteworthy monuments of the 13th century is the 'Chronica o Comentari' of Jaime I, which is at once a biography of his life and a history of his kingdom for that period. It was the first work of true history to appear in Spain. About it there is a freedom, naturalness and sincerity, and at times a loftiness of style combined with simplicity of diction and thought, which mark it as a real work of literature, throughout which the king's strong love of everything Catalan is constantly in evidence.

Under the protection of her sovereigns Catalonia produced poetry, history, moral philosophy and scientific works superior to any other literature in Spain at this time; and she may be said to have led the way for the brilliant Spanish drama which followed. Among the other very notable patrons of literature was Pedro III of Aragón, known as "the great," himself no mean poet and a noted writer on scientific subjects.

Catalan literature attained its highest development in the 14th and 15th centuries. During this period two names, Ramon Llull and Ausias March, stand prominently forth. Llull, who was born in 1235, was a voluminous writer of great talent who had a powerful influence upon the literature of his age. He seems to have covered almost every field of literary endeavor and to have done well nearly everything he attempted. He was a noted orator, naturalist, musician, mathematician, scientist, philologist, jurist, theologian and poet. His works cover almost the whole field of human knowledge. His hymns to the Virgin are sincere, tender and sweet. Devotion, love of country and the triumphs of religion are his chief themes, as they were those of most of the Catalan writers of his day. Between Llull and March (who died in 1460) there is a long list of Catalan writers who have remained unknown to the outside world simply because they unfortunately wrote in a language which was destined through the fortune of conquest to be looked upon as a dialect. These include Ramón Vidal whose 'La dreta maniera de trovar' (The Art of Poetry) had a powerful influence upon the most notable Catalan poets who followed him; Pedro de Aragón, Ramón de Muntaner, an excellent didactic poet, chronicler and historian; Bernat des Clos, a learned writer and historian of note who took for his special theme the counts of Barcelona and Pedro III. Muntaner writes as a soldier of what he saw during his long life, "so as not to lose the memory of those wonderful feats with which the Catalans and the Aragonese astonished the world." His work is extensive, varied, regular and methodical; and he writes with authority, in his

capacity of chancellor to the eastern expedition of the army under Roger de Flor. His work bristles with customs, characters, battles, sieges, speeches and conversations of leaders and warriors; descriptions of cities, districts and people, all presented in an original and simple, direct manner that makes camps and campaigns stand forth in relief. No such history had been written before in Spain. Among the other writers of this period were Llorens Mayol, Luis de Villarrasa, Arnaldo March, En Dalman Rocaberti, Juan Ruiz de Corelia, Andreu Faber, Jordi de Sent Jordi, Jaume March and Mossen Vallmayna, all of whom have left important literary remains. Faber translated the 'Divina Commedia' in 1428, Sent Jordi wrote excellent sonnets, and Vallmayna, a poet of note, was an authority on troubadour poetry.

Alfonso V so stirred up the literary enthusiasm of his people that it became the fashion among his nobles to patronize literature. Leonardo des Sors, Jaume de Aulesia and Jaume Roig, Lord Francesch Farrer and Lord Torrellas were all writers immensely popular in their day; and Marcó is specially worthy of note as a dramatist whose plays appeared toward the close of the 14th century and probably, through their popularity, helped to inspire the noted Spanish drama which followed shortly afterward.

The Golden Age.—Between this latter period and that of the rise of Catalan as a literary language is a short and very active period which began about the middle of the 15th century and ended with its close. The bright peculiar light of this, the height of Catalan literary activity, was Auseas March, the greatest and most original of the Catalan poets. He was a follower of Petrarch; but no servile imitator. Filled with the troubadour spirit, he wrote tender love songs, moral didatic poems and sentimental sonets full of true feeling and simplicity of diction. 'Cants d'amor' and 'Cants de Mort' are his best and most original poems. He was very popular during the 16th century when his works passed through several editions and were translated into Spanish (1539). With him Catalan begins to die as a national literature, as Catalan individuality soon merged itself into that of the United Spanish kingdom under Ferdinand and Isabel the Catholic. Yet Jaume Roig, who survived March 18 years, helped to keep alive Catalan traditions in his 'Libre de Consells' of which many editions were published. A caustic satire on women by Roig is a brilliant and trustworthy picture of Valencian life and habits in the latter half of the 15th century. It is especially valuable from a historical point of view. Contrary to the popular belief, native poetry was not dead in the Catalan country; for as dialect literature it was alive at the beginning of the 18th century. But from 1714 it lay practically dormant for over a hundred years.

Catalan Renaissance may be said to have begun with the works of Verdaguer, Soler and Rubió between 1840 and 1850, though some little interest had been taken in the language by philologists and literary historians previous to this time. Carlos Areban, a noted Spanish poet, wrote in his native Catalan, a fervid ode to his patron, Remisa, in which he painted the past glories of Catalan and mourned its neglected estate. This proved a powerful inspiration to native Catalans. It was extensively printed, recited and imitated, and brought vivid, patriotic imitators in its train who urged the study of the ancient Catalan literature; and, wonderful to relate, this artificial movement was immensely successful and it became the popular thing in Spain and elsewhere to praise and encourage Catalan. Rubió's poems, which began to appear in the public press in 1841, stirred up enthusiasm wherever Catalan was read. Looking to the past and praising the glories of ancient Catalan, they turned attention to a long-neglected and almost forgotten literature. Then came Sol y Padris, young, energetic and enthusiastic, who, taking men's eyes from the past, set them on the future. His became the voice of the prophet proclaiming the renaissance of Catalan. Borafull added to the movement æsthetic taste and good literary style; Villarraya, with his 'Canco,' and Páscula Pérez, with his 'Sent Vicente Ferer,' gave a new impetus and enthusiasm to the renaissance movement. After 1850 Bonilla and Baldoví added a new patriotic note. In 1861 Mila added still more to the Catalan revival by the publication of his 'Trovadores en España,' which painted, in glowing colors, the early literary history of Spain and especially Catalan. This was followed by Astorch's 'Catalan Grammar.' Blaguer became the bright particular propagandist for the return to Catalan; and Borafull, Mila and Rubió succeeded in restoring the ancient floral games which had done so much to encourage literature under the native kings. Teodoro Llorente and Vincente W. Queral added fervor, inspiration and correctness of style to the new movement and showed what Catalan was capable of producing in the way of modern literature.

Robreño y Renart revived the traditions of the ancient Catalan theatre in his very popular comic drama; and Federico Soler produced a series of musical parody comedies which were immensely popular, the first of these appearing in 1864. Vidal y Valenciano, in 'Tal farás tal trovarás' revolutionized the Catalan drama, inspired numerous other writers of note, and established the popularity of the rising Catalan theatre. Damaso Calvert, Conrado Roure and Francisco Pelayo Briz and numerous lyric poets helped along the Catalan revival. Newspapers and journals in Catalan appeared in various cities and Catalan theatres and good actors sprang up all over the land. Among the later names of this movement the most noted are Ignacio Iglesias, Rusigñol and Ángel Guimerá. Of these the latter is by far the greatest name in Catalan literature and his is the foremost name in modern Spanish drama, even though his plays have had to be translated from Catalan into Spanish. Guimerá's name is synonymous with Catalan drama. He began exhibiting his plays when there was no theatre which would take them, for they had no commercial value; and he has lived to see Catalan drama in possession of the Teatro Principal of Barcelona, the largest playhouse in all Spain, and to rejoice over its possession of excellent theatres not only in Catalonia, but in all the principal cities of the land. Guimerá has been proclaimed, by the whole Spanish people, one of the greatest geniuses of the Spanish stage and of Spanish literature, of which Catalan is nationally looked upon in Spain as a dialect.

He is very emotional, imaginative, strong, fierce at times; a master of situations and all the tricks of the drama. He always goes straight to the heart of the situation and he has as strong a dramatic sense as Shakespeare and Hugo, his two great masters. His early plays were written in blank verse; but later he adopted a peculiarly vivid and exact prose in which redundances and verbosity of all kinds were avoided. Rapidity of movement distinguishes all his work. Among his dramas, which are numerous, are 'Gala Plácida'; 'Mar y Cel'; 'L'Anima Morta'; 'Lo Fill del Rey'; 'Las Monjas de Sant Aymán'; 'En Pólvora'; 'Terra Baixa' (translated into English under the title of 'Marta of the Lowlands'); 'Aygua que Corre'; 'Las Pecadors'; 'Sol Solet'; 'Lo Cami del Sol'; 'Jesús de Nazareth'; and 'La Reyna Jove.' He has also written comedies of local customs, farces and distinctly romantic dramas, poems and patriotic songs. He was the first to carry Catalan drama beyond the boundaries of Spain. His plays have been translated into more than a score of languages and the best of them have been played in nearly all the great capitals of Europe and America. 'Tierra Bajá,' in the translation made by Wallace Gillpatrick of New York, was presented on the metropolitan stage in 1903 and since then it has been periodically revived, has traveled across the continent several times and has been taken to England. 'Maria la Rosa' has also been translated into English.

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JOHN HUBERT CORNYN,
Editoral Staff of The Americana.

CATALANGANES, kä-tä-län-gäns', a Malay people of Mongoloid type, living in the flood plain of the Catalangan River (province of Isabela, Luzon, Philippines). They are clean and industrious, and dress like the Christian Malays. They worship two pairs of gods, and their ancestors. They are heathen and peaceable and speak the same language as the Irayas. Consult Sawyer, 'The Inhabitants of the Philippines' (1900).

CATALANI, kä-tä-lä'nē, **Alfredo,** Italian composer: b. Lucca, 19 July 1854; d. Milan, 7 Aug. 1893. He was graduated at the Paris Conservatory and settled in Milan, where he achieved fame with brilliant operas, especially 'Dejanice,' 'Lorely' and 'La Wally.'

CATALANI, Angelica, Italian singer: b. Sinigaglia, most probably in 1782, although several other years are given; d. Paris, 13 June 1849. As early as her seventh year her magnificent voice had become the subject of general remark, but it was not till the age of 14 that she received any instruction in the higher departments of the musical art. At 16 she was compelled by family misfortunes to turn her talents to account, and made her first appearance on the stage at Venice. She afterward filled the grand soprano parts at the operas of Milan, Florence, Rome and Naples and in 1799 accepted an engagement at the opera of Lisbon, where she continued for five years. She then visited successively Madrid, Paris, London and the principal towns of Great Britain, in all of which her success and profits were immense. In 1814 she returned to Paris to take the management of the Italian opera there, but sustained thereby severe pecuniary losses from the injudicious interference of her husband, de Valabrégue, formerly a captain in the French army. On Napoleon's return in 1815 she was obliged to resign the direction of the opera, but resumed it again on the second restoration. In 1818 she again resigned the direction of the opera, and from that year till 1828 made repeated professional tours through the Continent and Great Britain. In 1830 she retired from public life to a villa in the neighborhood of Florence, and here she resided with her family and gave instruction to girls who manifested indications of local talent, one condition being required from them that they should adopt the name of Catalani. She was a woman of majestic appearance and her voice displayed a wonderful degree of power, flexibility and compass. She rather astonished and overpowered an audience than touched or subdued their hearts by her marvelous execution. Consult Edwards, 'The Prima Donna' (Vol. I, London 1888); Ferris, 'Great Singers' (New York 1893); Needham, 'Queens of Song' (London 1863); Lahee, H. C., 'Famous Singers of To-Day and Yesterday' (Boston 1900).

CATALAUNIAN PLAIN, the ancient name for the wide plain around Châlons-sur-Marne, in France, famous as the field where Aëtius, the Roman general, and Theodoric, King of the West Goths, gained a complete victory over Attila and the Huns, 451 A.D.

CATALDO, kä-täl'dō, **SAINT,** Italy, town in the province of Caltanissetta, five miles west-southwest of the town of Caltanissetta. The sulphur works in the environs produce annually about 1,875 long tons. Pop. 12,800.

CATALEPSY, a peculiar motor phenomenon, not a disease, that is found in a number of nervous disorders. It consists of a persistent muscular attitude of some part of the body, and may or may not be attended by unconsciousness. Thus a person may place the right arm or leg, or another may so place the limb, in a peculiar, or awkward, or in fact any position. This position is maintained by the patient for a very long time, usually a time much longer than a normal individual could maintain it. Almost any muscle group may be involved. The patients may squat on the floor, or stand on one leg for hours, or hold both arms in the air almost all day. There seems to be some form of muscle anæsthesia and the position of the limb seems to be unknown and unfelt by the patient. This symptom is very frequent in cases of true hysteria (q.v.), and it is also found in a number of other affections that cluster about hysteria. Thus it is present in somnambulism, in hypnosis, in a peculiar mental state known as catatonia (q.v.) and in stuporous melancholia,— all of which have much in common, being affections superimposed on the hysterical nervous organization, a type of make-up of a character, whose main features

are assuming a definite recognition by students of the functions of the nervous system. The normal functions of respiration, digestion and circulation continue. Prolonged cases demand forced feeding. Between attacks cold baths, tonics and various remedies are recommended. An emetic or a pinch of snuff may sometimes avert an attack. The disease still demands investigation, as its immediate cause is not known. Consult Janet, 'Mental State of Hystericals'; Raymond, 'Obsessions et Psychasthenies'; Starr, 'Text-Book of Nervous Diseases.'

CATALOGUES. See LIBRARY ADMINISTRATION.

CATALONIA (Spanish *Cataluña*), formerly a semi-independent principality of Spain, then a part of the domains of the Crown of Aragon and now a captaincy-general of the Spanish kingdom. Catalonia, which is composed of the four provinces, Gerona, Lérida, Barcelona and Tarragona, occupies the northeast corner of Spain. It is bounded on the east by the Mediterranean Sea, on the north by the Pyrenees, on the west by Aragon and on the south by Valencia. It comprises about 12,500 square miles of territory and has a population of about 2,000,000. The country, on the whole rugged, contains many fertile valleys watered by numerous streams and rivers, none of which are navigable. Along its coast of 240 miles are numerous harbors, the best of which are Barcelona, Tarragona, Mataró and Rosas. Of the rivers of the country, all of which flow into the Mediterranean, the Ebro alone is worthy of note, though most of the streams are famed in the traditions of the people and its rulers. In the regions of the interior, which are traversed by a spur of the Pyrenees running in a southern direction in a very broken formation, are many wooded hills and peaks from which much commercial wood is taken. But the non-wooded lands, wherever workable, are nearly all devoted to agriculture. The rugged hillsides, however, support many goats and sheep; but comparatively few cattle. Everywhere the country is visited by mists and rains, and these make the low coast lands fertile. Though hot they are healthful except in the low and swampy parts, which are comparatively few. In the higher regions the climate passes from cool and temperate to quite cold, for the snow lies on the mountain summits nearly the whole year.

The people of Catalonia, owing to the fact that for centuries they have had to defend their language, customs and individuality, have become clannish. They had originally a clan system, the country being occupied by numerous independent tribes who never united except in case of common danger. Among these tribes who distinguished themselves during the Roman connection with Catalonia or later were the Ceretanos, Russinos, Indigentes, Lacetanos, Laletanos, Suesetanos, Sedetanos, Cosetanos, Acetanos, Ilergentes, Ilercanos and Ausetanos. These and the other tribes of Catalonia, notwithstanding their lack of political unity and nationality, were great traders and very active in all the occupations and pursuits of life. They were venturesome sailors and traded up and down the coast, along which they appear to have planted colonies before the coming of outsiders to their land. The first of these were the Phœnicians who for a considerable space of time carried on trade relations with the east coast of Spain. The natives learned much from their more cultured neighbors; and, imitating them, they became still bolder sailors and are said to have sailed out through the Straits of Gibraltar and to have coasted down the west coast of Africa for a considerable distance. The Greeks followed the Phœnicians to Catalonia, and were also received in a most friendly manner by the natives, who also increased their knowledge of civilization through their contact with the Greeks.

This prosperity and peace was broken up by the Carthaginians under Hamilcar, who, hearing that Catalonia was rich in gold mines, landed a large force of trained soldiers on the coast with a view of conquest. A prolonged and desperate struggle followed; and several times the Carthaginians suffered defeat. Hannibal followed his father to Spain and had the same fierce struggle. Whenever the invaders were victorious they put the natives to the sword. It was during this struggle that Barcelona was founded on the coast as a fortress and place of refuge for the invaders driven back from the interior. When war broke out between Rome and Carthage, C. Scipio seized the coast of Catalonia, and P. Cato, after a long and desperate struggle, finally reduced the country to slavery. The devastated land was redivided, policed by the Roman army and peace finally settled down upon it. In the course of time many of the natives rose to prominence throughout the conquered land and the Romans and the Catalans intermarried and formed a mestizo race which had already become a strong factor in the national life before the overthrow of Roman power. Flourishing towns and cities sprang up all over Catalonia. Over 600 of these are mentioned on the Roman tribute lists, which were kept at Tarragona, the capital of the province. Roman law was extended everywhere throughout Catalonia; and roads, temples, theatres, circuses, public baths and magnificent private residences and stately temples existed in all the chief cities, until at last Catalonia became another Italy and the favored province of the Romans. The Emperor Adrian gave a special constitution to Catalonia; and Rome looked upon the country as one of the storehouses of the empire.

But the invasion of the Goths and other barbarians once more arrested the prosperity of Catalonia; which finally, after another period of desperate struggle, became the head of a kingdom founded by Ataulfo. In the time of Teodorico a popular insurrection against the harshness of the government of the native rulers started in Catalonia and spread rapidly over all Spain. Civil war lasted for over half a century and numerous Spanish generals sent to reduce Catalonia were themselves signally defeated. Shortly after peace had been restored the Arabs overran the coast; but they found the Catalans as hard to conquer as had the other invaders, for they were defeated several times, and signally so in 756. Other bands of Saracens were driven out with the help of Charles the Great. Catalonia was annexed to Aragon through the marriage of the heads of the two countries, and it was under French rule three different times between 1640

and 1813. It fought gallantly and savagely in the wars against Napoleon and took part in the civil wars in Spain in 1820, 1823, 1827 and in the later Carlist troubles. In 1842 Barcelona was bombarded by the Spanish army; and during the struggle that preceded and followed this bombardment it several times defeated noted Spanish leaders. Barcelona is the great revolutionary centre of Spain to-day; and this is probably why the people cling so tenaciously to their customs and language.

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CATALPA, kā-tâl'pa, a genus of trees of the family *Bignoniaceæ,* consisting of about 10 species in North America and Asia. They have large, entire or lobed leaves, large panicles of showy white, yellow or pink flowers, and fruit of long, slender, cylindrical pods. *C. catalpa,* the common catalpa or Indian bean, is a native of the southern United States. *C. speciosa,* a similar species, the western catalpa, ranges from Illinois and Indiana to Louisiana and Mississippi. The wood of these two species is coarse-grained and soft but very durable in the ground, consequently it is much valued for fence-posts and railroad ties. These species and some of the Asiatic ones are very widely used as shade trees.

CATALYSIS, or **CATALYTIC ACTION** (Gk. *καταλύειν,* to dissolve). Certain chemical reactions are very markedly accelerated in the presence of substances which emerge from the reaction unaltered. For example, cane sugar is inverted (changed into a mixture of dextrose and levulose) in the presence of acids with a velocity that increased with the strength of the acid. This phenomenon is called catalysis, and the acid is said to be a catalyst. Water, which delays the reaction, is said to be a negative catalyst. Again, it is possible by the formation of an arc under water to obtain ultramicroscopic suspensions of many of the metals, such as gold, silver or platinum. These suspensions have the remarkable property of decomposing hydrogen peroxide very rapidly into water and oxygen, while they themselves remain unchanged. A similar action is shown by certain organic substances, the enzymes. In the case both of the enzymes and of the ultramicroscopic colloidal metallic suspensions, the catalytic action is immensely diminished by the presence of very slight quantities of certain poisonous substances such as hydrocyanic acid or hydrogen sulphide. Another interesting example of catalysis is the action of platinum—black or sulphur dioxide and oxygen, which unite in its presence to form sulphur trioxide. Water vapor is often a catalytic agent; dry ammonia vapor and dry hydrochloric acid will not unite. This example illustrates the fact that catalytic agents accelerate both halves of a reversible reaction, for dry ammonium chloride can be vaporised without dissociating into ammonia and hydrochloric acid. Catalysis is an extremely common phenomenon in chemistry. Its nature is not well understood; it is agreed that in certain reactions which appear catalytic the "catalyser" enters into the reaction and is ultimately regenerated, but this explanation does not cover all the cases found. In the case of platinum black, which acts as a catalyser in many reactions, Faraday considered that the action was due to the approximation of the molecules of absorbed gases. This case, however, has also been explained as due to the formation of intermediate products into which platinum enters. In general, most catalysis is a surface action, and is accelerated by fine subdivision of the catalyst because of the immense areas thus brought into play. Certain substances are known to catalyse themselves. See also ENZYMES.

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CATAMARAN, kăt'a-mą-răn, a sort of raft used in the East Indies, Brazil and elsewhere. Those of the island of Ceylon, Madras and other parts of the Indian coast are formed of three logs. The timber preferred for their construction is the dup-wood or *cherne-maram,* the pine-varnish tree. Their length is from 20 to 25 feet and breadth 2½ to 3½ feet. The logs of which they are constructed are secured together by means of three spreaders and cross lashings through small holes. The centre log is much the largest and is pointed at the fore end. These floats are navigated with great skill by one or two men in a kneeling posture. They think nothing of passing through the surf which lashes the beach at Madras, and at other parts of these coasts, when even the boats of the country could not live upon the waves, and they are also propelled out to the shipping at anchor when boats of the best construction would be swamped. In the monsoons, when a sail can be got on them, a small outrigger is placed at the end of two poles as a balance, with a bamboo mast and yard, and a mat or cotton-cloth sail. The name is applied also to the double boat in the United States. These have almost always proved very slow. However, some have been built for racing purposes which were satisfactory. In the United States navy the term "catamaran" is sometimes applied to the balsa or to a float used for the men who clean the ship's side along the water line.

CATAMARCA, kä-tä-mär'cä, Argentina, province, bounded north by Salta, east by Tucuman and Santiago del Estero, south by Cordoba and Rioja and west by Rioja and Chile; area, about 47,530 square miles. The surface is very mountainous in parts, except the southern, where it stretches out into a large plain. The loftiest and best known of the mountains is the Sierra de Aconquija, which stretches from south to north and attains in its culminating point near its southern extremity a height of more than 16,000 feet. The Santa Maria, flowing north to the Huachipas, is the only river of any importance, but as every valley has its

mountain stream, the whole province is well watered. Most of the smaller streams are dry in the summer, but overflow in the winter. There are also a number of salt lakes. The soil is fertile, producing large crops of maize and wheat and supporting large numbers of live stock, especially goats. The vine is also cultivated and yields wine and spirits which bear a high name in the surrounding countries. The principal exports are beasts of burden, horned cattle and hides and goatskins, raw or tanned. The principal mineral is iron, but gold, silver and lead are also found. The capital is Catamarca. Pop. (1910) 110,317, chiefly of Indian extraction, with a considerable mixture of Spaniards.

CATAMARCA, Argentina, the capital of the province of Catamarca, situated on the Valle River, 82 miles northeast of Rioja and about 250 miles northwest of Cordoba. It is connected by rail with Rioja and all the chief towns of the republic. It is regularly and moderately well built and contains a fine town-hall, a Franciscan monastery, a national college and a normal school for women. There are considerable imports of European goods and the place is the centre of distribution for a flourishing district. Dried figs, wines, brandy and cotton are the principal articles of export, together with the curious form of embroidery for which the women are celebrated. It was founded in 1683. Pop. (1905) 8,000; (1916) 13,900.

CATAMOUNT, a short form of the phrase "cat of the mountain," frequently found in the older books about America and still occasionally used as a name for the lynx of the eastern United States, and sometimes for the puma, or "panther," once common in New England. The term is so indefinite that it is well that it has fallen into disuse.

CATANDUANES, kä-tän-dwä'nēz, Philippines, an island lying northeast of the province of Albay, Luzon; its length is 44 miles north and south; width, 29 miles at the southern end; area, 704 square miles. The mountain system consists of three ranges that radiate from Mount Catilamong near the centre of the island; the rest of the surface is irregular, covered with low hills. The most important rivers are the Ocó and the Bató or Cabugao; there are also a number of smaller rivers, and the island is well watered. The soil is fertile, and rice, cotton, corn and hemp are raised; indigo and cocoanuts are exported. The natives find gold, both dust and nuggets, in the gravel beds of many of the rivers. The largest town is Birac (pop. 5,832). The island does not form a province of itself, but is a constituent part of the province of Albay, and is included in the military department of Luzon. Pop. 33,300.

CATANIA (ancient CATANA), Italy, city of Sicily, in the province of Catania, on the borders of the valley of Noto, the see of a bishop, the suffragan of Monreal, 47 miles south-southwest of Messina, 85 east-southeast of Palermo. It is situated on a gulf of the Mediterranean, at the foot of Mount Ætna. This city has been repeatedly visited by violent earthquakes, and partially laid in ruins by lava from eruptions of Mount Ætna. The most disastrous eruption was that of 1669, by which many of the antiquities of Catania were overwhelmed, and the worst earthquake was that of 1693, when 18,000 people were destroyed. Although again greatly injured by the earthquake of 1783, Catania is now reviving with great splendor and has much more the features of a metropolis than Palermo. The principal streets are wide and well paved with lava. Most of the edifices have an air of magnificence unknown in other parts of the island, and the town has a title to rank among the elegant cities of Europe. An obelisk of red granite, placed on the back of an antique elephant of touchstone, stands in the centre of the great square, which is formed by the town-hall, seminary and cathedral. The cathedral, a fine building, was founded in 1091 by Count Roger, but required to be mostly rebuilt after the earthquake of 1693. It is dedicated to Saint Agatha, the patroness of the city. The suppressed Benedictine monastery of Saint Nicholas, comprising a church (with splendid organ), library, museum and other extensive buildings, was long celebrated for wealth and splendor. The university, founded about 1445, has about 1,200 students, a school of pharmacy, a library of over 130,000 volumes and a fine collection of shells. The ruins of the amphitheatre, which was more extensive than the Coliseum at Rome, are still to be seen, as also the remains of the theatre, baths, aqueducts, sepulchral chambers, hippodrome and several temples. The industries include the manufacture of silk, linen and cotton goods, and objects in lava, wood, marble and Sicilian amber, and the mining of sulphur. The harbor was formerly a good one, but by the eruption of 1669 its entrance was almost entirely choked up, and it is only in recent times that it has been improved, a considerable amount of money having been spent on it. The trade of Catania is of some importance, the principal export being sulphur, next to which come oranges and lemons, almonds and other fruits and wine. Cereals, textiles and other manufactures are the chief imports. The exports have an average annual value of about $5,000,000. A circular railway runs from Catania round the base of Mount Ætna. The classic Catana was founded by Greeks from Chalcis about 729 B.C. and soon became prosperous. It was the Athenian headquarters in the war between Athens and Syracuse 432 B.C. It flourished under the Romans, by whom it was taken in 263 B.C. It was plundered by the Saracens and fortified by the Normans, and in 1169 A.D. almost destroyed by an earthquake. It was restored in 1232 and fortified by Frederick II, and again flourished for four centuries until the great earthquake and eruption of 1669, which nearly filled up the harbor. Pop. 211,699.

CATANZARO, kä-tän-zä'rō (ancient CATACIUM), Italy, city and capital of the southern province of the same name, on a height, eight miles from the Gulf of Squillace. It suffered severely from the great earthquake of 1783, but is still a place of some importance, defended by a citadel, and containing a cathedral and various other churches, an academy of sciences, one of the four great civil courts of the kingdom, a lyceum and three hospitals. The climate being cool and healthful in summer, many wealthy families reside here. The manufactures consist chiefly of silk and velvet,

and there is some trade in wheat, wine, oil, etc. Pop. 34,103.

CATAPHORESIS, kăt-a-fôr-ē'sĭs, a method of introducing remedies into the body by means of electricity. While certain substances can be made to penetrate the skin by means of electrical currents, the general cataphoretic method has not found favor with conservative and careful observers.

CATAPHRACTI, a group of fishes known also as "mailed-cheeked," characterized by having a bridge-like bone running from below the eye to the gill covers. The group includes the rock-fishes, scorpion-fishes, sculpins, sea-poachers, gurnards, lump-suckers and sea-snails. Most of these live in the sea, but there are several species of sculpins which dwell in fresh-water streams and lakes and are known as miller's thumbs. The names *Loricati* and *Pareiopliteæ* are also applied to this group. Consult Jordan and Evermann, 'Fishes of North and Middle America.'

CATAPLASM, poultice or plaster applied to sore parts to increase suppuration, relieve pain, stimulate the skin or some similar purpose. It may be composed of any moist and pulpy substance that will retain the water without dripping or soaking through thin muslin covering in which it is usually wrapped. Cataplasms are not official in the United States Pharmacopœia. The linseed-meal poultice is the most easily made, and most satisfactory of all soothing applications. The meal is stirred gradually into a sufficient quantity of boiling water, placed in the bottom of a small basin or teacup, until a perfectly smooth pulp is formed of the proper consistency, and in quantity sufficient to cover completely, to the thickness of three-quarters of an inch, the whole painful part. The pulp is then folded up in muslin or thin calico and applied as soon as the heat will permit it to be borne. The bread and milk, or even bread and water poultice, is also very good; as is also the oatmeal-porridge poultice, to which a little butter may be added with advantage. A spoonful or two of yeast may be added, if there are foul discharges, or charcoal may be sprinkled on the surface of the poultice before it is applied. Poultices made of clay and glycerin have the great advantage over linseed or bread poultices in that they can be made aseptic. When considerable irritation of the skin in a short time is desirable, a mustard plaster or sinapsim [*sinapi,* mustard] is used. The making of an effective poultice, however, is rather a delicate operation, since numerous little niceties must be considered and proper conditions observed before a desirable preparation is obtained.

CATAPULT, an engine of war, which had considerable vogue among the ancients. It somewhat resembled a crossbow, and was operated by means of a string or rope, suddenly freed from great tension, which gave a powerful impulse to an arrow placed in a groove. There were various modifications of catapults, but in essential purpose and construction they were all alike. Thus, there were catapults fixed upon a scaffold with wheels, which were used for hurling huge stones in sieges; smaller machines that were readily portable were employed in field operations. A toy catapult was and still is used by boys at play for throwing stones or similar projectiles.

CATARACT. An opacity of the lens of the eye. See Eye.

CATARACTS (from Latin, *cataracta,* a "water-fall"), one of the names given to sudden descents in streams of water, the more general English term being fall or falls. A considerable declivity in the bed of a river produces rapids. When it shoots over a precipice it forms a cataract. If it falls from steep to steep, in successive cataracts, it is often called a cascade. In rocky countries rivers abound in falls and rapids. In alluvial districts, falls, of course, are very rare. Rapids and cataracts are often a blessing to rugged countries, since they furnish the cheapest means of driving machines in manufactories, etc. In recent times water-falls have been utilized in the furnishing of electric power in addition to ordinary water power. Many cataracts are remarkable for their sublimity, the grandest known being Niagara Falls (q.v.), on the Niagara River, between Lakes Erie and Ontario. Some others of note are mentioned below.

The Montmorency River, which joins the Saint Lawrence a few miles below Quebec, forms a magnificent cataract, 250 feet high. The Missouri, in the upper part of its course, descends 357 feet in 16½ miles. There are four cataracts, one of 87, one of 19, one of 47 and one of 26 feet high. The Yosemite River in California forms a series of magnificent falls, with a total descent of 2,600 feet. The first of them is a plunge of 1,500 feet, and is followed, after a series of beautiful cascades, by a final plunge of about 400 feet. Fully 200 miles from the mouth of the Hamilton River in Labrador there is a magnificent series of cataracts known as the Grand Falls, the largest having a height of over 300 feet. In Colombia, South America, a great cataract, that of Tequendama, is formed by the Bogotá River. The river precipitates itself through a narrow chasm, about 36 feet broad, to the depth of over 600 feet. On the Potaro River in British Guiana, the Kaieteur Fall, 740 feet high, and about 370 broad, is a splendid spectacle, and just below it is a second fall of 88 feet.

The most remarkable waterfall in Africa is one with which Dr. Livingstone's missionary travels first made us acquainted. This is a cataract on the Zambesi, called by the natives Mosioatunya ("smoke sounds here"), named by him Victoria Falls. The stream, about 1,860 yards broad, flowing over a bed of basaltic rock, is suddenly precipitated into a tremendous fissure, extending across the bed of the river from the right to the left bank, to the depth of about 370 feet. The breadth of this fissure or crack is only from 80 to 90 yards, and the pent-up waters, from which immense columns of vapor are continually ascending, are then hurried through a prolongation of the chasm to the left with furious violence. The so-called Cataracts of the Nile are not, properly speaking, cataracts. A more correct designation for them would be "rapids." The Stanley Falls on the Kongo comprise seven cataracts. On the Tugela River in Natal there are the Tugela Falls. On the Umgeni River,

in the same country, are the falls of the Great Umgeni (364 feet) and the Kar Kloof Falls (350). There seem to be no waterfalls of more note in Asia than those of the Cavery River of India.

One of the grandest falls in Europe is that of the Ruikanfoss ("smoking fall"), on the Maan River in Norway. The height of the cataract is 805 feet. In Sweden, on the Gotha River, a few miles below its outlet from Lake Wener, are the celebrated falls of Trollhätta, which have a height of over 100 feet. The cascade of Gavarnie, in the Pyrenees, is reputed the loftiest in Europe, being over 1,300 feet high. Its volume of water, however, is so small that it is converted into spray before reaching the bottom of the fall. Another waterfall in the Pyrenees is that of Seculéjo, in the neighborhood of Bagnères-de-Luchon. It descends from the Lac d'Espingo, into the Lac de Seculéjo, or d'Oo, a singularly romantic mountain reservoir, from a height of 820 feet, and is the most copious of the Pyrenean waterfalls. The Swiss Alps likewise contain some falls of great sublimity. At Lauterbrunnen, in addition to numerous other cascades, is the renowned fall of the Staubbach, about 870 feet high, which, however, from its small volume of water, has none of the terrific adjuncts of a cataract, and resembles, in front, a beautiful lace veil suspended from the summit of the precipice. Near Martigny is the picturesque waterfall of the Sellesche or Pissevache, the final leap of the cascade being 128 feet. The falls of the Rhine at Schaffhausen are renowned over Europe. They are 300 feet broad and nearly 100 feet high. In Italy the falls of Terni, or the Cascate del Marmore on the Velino, have been immortalized by Lord Byron, and, though artificial, are justly regarded as among the finest and most picturesque in Europe. They consist of three falls, the aggregate height of which may be estimated at 550 feet. The falls of the Anio or Teverone, at Tivoli, are likewise very beautiful. They, too, are artificial, and have a fall of about 80 feet.

CATARMAN, kä-tär-män', Philippines, a town on the north coast of the island of Samar, situated on the Catarman River, 55 miles northeast of Catbalogan. It has a good anchorage ground. In 1871 the town was destroyed by a volcano which burst forth in July from low land on the west side of the island, and in two months had thrown up a hill two-thirds of a mile long, one-third of a mile wide and about 450 feet high, destroying all vegetation for miles around. At the time of the visit of the *Challenger,* January 1875, the volcano had attained a height of 1,950 feet, and was still active, there being visible columns of smoke by day and series of small fires at its summit by night. Pop. 10,482.

CATARRH, kạ-tär', a flow from a mucous membrane. It is a symptom purely, and not a disease, and any mucous membrane of the body may be affected by an acute or chronic inflammation, usually entitled an acute or chronic catarrh; as, catarrh of the nasal mucous membrane, of the pharynx, larnyx, stomach, intestines, rectum, bladder, vagina, etc. The word has general significance only, but it is much used by vendors of nostrums. See NOSE AND THROAT.

CATASAUQUA, Pa., a borough of Lehigh County, on the Philadelphia and Reading, the Central of New Jersey and the Lehigh Valley railroads, and on the Lehigh River, three miles north of Allentown; settled in 1805, chartered as a borough in 1853. Anthracite pig iron was made a commercial success here as early as 1839, and Catasauqua became a busy manufacturing centre, developing blast furnaces, foundry and machine shops, hardware factories, silk mills, rubber goods, car wheels, etc. Pop. 5,250.

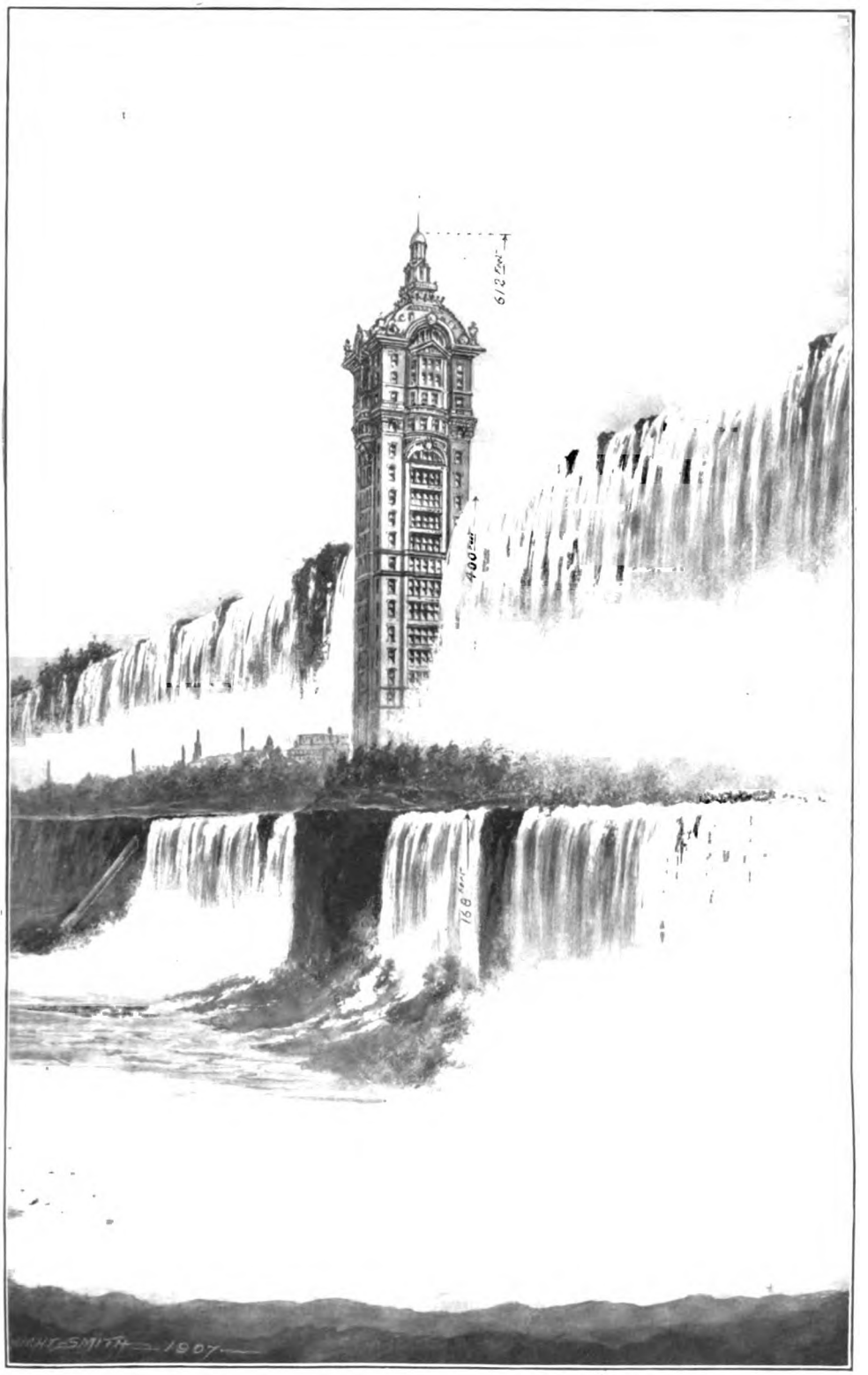
CATATONIA, a variety of schizophrenia —or dementia præcox, which latter is the most frequent of all mental disorders. The catalonic variety is the most severe and is usually marked by a greatly increased tendency toward excessive motor reactions, such as negativism, catalepsy, mannerisms and violent tempestuous outbreaks, often extremely furious in their character. It is a form of the mental disorder which most frequently exhausts the patient and leads more often to tuberculosis.

These patients often will stand in one position, often an extremely strained one, for hours at a time, sometimes days, often weeks. Some cases are known, for instance, to lie rigid in bed like a corpse for six months or a year at a time, refusing to pay any attention to the external world. They urinate and defecate in bed and may have to be tube fed all this time. Others will make incessant stereotyped movements, walking backward and forward like animals in a cage, or go through certain occupational movements, sawing, hammering, etc., hour upon hour without interruption. They may stand in a rapt attitude all day long without so much as winking. Sometimes they talk incessantly, saying the same thing over and over again. Others make wild rushes here and there in their rooms, beating their fists against the walls or a piece of furniture.

Careful study of these cases shows that the movements always have a certain symbolic significance for the individual. They are frequently made in response to hallucinatory voices or images and can usually be resolved to certain elementary instinctive desires of the individual, usually connected with sexual taboos of some kind.

The causes are not completely revealed. In some there are obvious endocrinopathic disturbances. Certain psychiatrists regard these latter as primary; others are disposed to view them as secondary to the disturbances in the emotional fields of activity. Thus these hold the primary defect to lie in patients' incapacity to make social adjustments along the line of the love-life of mankind. This incapacity is revealed in the unconscious strivings which are greatly distorted in the behavior of the individual and hence are uninterpretable, so modified are the symbolic expressions of this internal conflict. The catatonic cases occasionally get well following an acute maniacal period, but when the disease is prolonged 5 to 10 years they usually make up a great mass of the chronic incurable lunatics of our hospitals for mental diseases. See DEMENTIA PRÆCOX. Consult Jelliffe and White, 'Diseases of the Nervous System' (2d ed., 1917).

SMITH ELY JELLIFFE.



Comparison of Victoria Falls (Africa), 400 feet high, with Niagara Falls, 168 feet high. The tower of the Singer Building (New York), 612 feet high, rises above the crest.

CATAWBA, or GREAT CATAWBA, RIVER. See WATEREE RIVER.

CATAWBA, a light, sparkling wine, of rich Muscatine flavor, produced in several parts of the United States. It is made from the Catawba grape, first found growing on the banks of the Catawba River in the Carolinas. This wine is now in extensive use, and is gradually superseding Rhenish and French sparkling wines, to which, in general character, it bears a resemblance.

CATAWBAS, derived from the Choctaw, signifying "divided," a tribe of Indians formerly inhabiting Nauvasa and five other towns on the Catawba River, an attractive region in North and South Carolina. The tribe is now represented by about 100 half-breeds, some of whom speak the ancient language, on a small State reservation on Catawba River, in York County, S. C. In early colonial times they were a powerful tribe numbering about 6,000, including 1,500 warriors. Wars and degeneracy reduced their numbers until they dwindled to 450 in 1822. Peter Harris, the last pure-blooded Catawba, was a Revolutionary soldier. Longfellow's verse popularized Catawba wine, the grapes for which, found near the banks of the Catawba River in 1801, were named in 1828 by Major Adlum.

CATBALOGAN, kạt-bä-lō-gän', Philippines, capital of the province of Sámar, situated on a small bay at the mouth of the Antigas River on the west coast. It is protected by a number of islands, Daram being the largest. The anchorage ground is not safe during monsoon weather; Parasan Island Bay, 10 miles west, is then the refuge for vessels. The town has a large trade in hemp and cocoanut-oil with Manila, which is 338 miles northwest, and steamers from Manila call every two weeks. Pop. 7,758.

CATCH, a short piece of music peculiar to England, written generally in three or four parts. It is a sort of short canon, the second voice taking up the theme when the first has completed the first phrase, the third following the second in same manner. These compositions are most frequently of a humorous and bacchanalian character and have been from Purcell's time very popular in England. There is a Catch Club in London which was founded in 1761.

CATCHFLY, any one of several plants of various genera. The name is perhaps most commonly applied to species of *Silene,* of the family *Silenaceæ,* since their calyces and stems exude a clammy, sticky substance which attracts flies and holds and kills those that alight. Certain species of *Lychnis,* a closely related genus, especially *L. viscaria,* are also popularly called by this name. Sometimes, too, the Venus flytrap is called Carolina catchfly. See CARNIVOROUS PLANTS; LYCHNIS; SILENE.

CATEAU, kä-tō, Le, or CATEAU-CAMBRÉSIS, käṅ-brā-zē, France, a town in the department of Nord, on the right bank of the Selle, 15 miles east-southeast of Cambrai. It was once fortified, though now open, and is famous for the treaty of its name signed here in 1559, by which Henry II of France gave up Calais to the English; and agreed to abandon all he had conquered from Spain on condition that that country would do the like with her French conquests. Altogether France lost 189 fortified towns by the treaty. Le Cateau has manufactures of cotton, wool, merinos, cambric shawls and a considerable trade in them and in wine, iron, coal and agricultural products in general. Pop. 10,500.

CATECHESIS, kăt-ĕ-kē'sĭs, the science which teaches the proper method of instructing beginners in the principles of the Christian religion by question and answer, which is called the catechetical method. Hence catechist and catechize. The art of the catechist consists in being able to elicit and develop the ideas of the youthful mind. This part of religious science was first cultivated in modern times, and Rosenmüller, Daub, Winter, Heinrich, Müller, Schwarz, Palmer and others have particularly distinguished themselves by their writings upon it.

CATECHETICAL, kăt-ĕ-kĕt'ĭ-kăl, SCHOOLS, institutions for the elementary education of Christian teachers, of which there were many in the Eastern Church from the 2d to the 5th century. They were different from catechumenical schools, which were attached to almost every church and which were intended only for the popular instruction of proselytes and children; whereas the catechetical schools were intended to communicate a scientific knowledge of Christianity. The first and most renowned was established about the middle of the 2d century, for the Egyptian Church at Alexandria, on the model of the famous schools of Grecian learning in that place. (See ALEXANDRIAN AGE). Teachers like Pantænus, Clement and Origen gave them splendor and secured their permanence. They combined instruction in rhetoric, oratory and music, in classical Grecian literature and the Eclectic philosophy, with the principal branches of theological study, exegesis, the doctrines of religion and the traditions of the Church; distinguished the popular religious belief from the *Gnosis,* or the thorough knowledge of religion; established Christian theology as a science and finally attacked the dreams of the Chiliasts (believers in a millennium); but by blending Greek speculations and Gnostic phantasies with the doctrines of the Church, and by an allegorical interpretation of the Bible, contributed to the introduction of heresies. The distraction of the Alexandrian Church by the Arian controversies proved the destruction of the catechetical schools in that place about the middle of the 4th century. The catechetical school at Antioch appears not to have been a permanent institution like the Alexandrian, but only to have been formed around distinguished teachers, when there happened to be any in the place. There were some distinguished teachers in Antioch about the year 220. We have no certain information, however, of the theological teachers in that place, such as Lucian, Diodorus of Tarsus and Theodore of Mopsuestia, until the latter part of the 4th century. These teachers were distinguished from the Alexandrian by more sober views of Christianity, by confining themselves to the literal interpretation of the Bible, by a cautious use of the types of the Old Testament and by a bolder discussion of doctrines. The Nestorian and Eutychian controversies, in the 5th century, drew after them the ruin of the schools at Antioch. Of a similar character were the schools instituted at Edessa

in the 3d century and destroyed in 489, and the school afterward established at Nisibis, by the Nestorians, in its stead; both of which were in Mesopotamia. To these schools succeeded, at a later date, the cathedral and monastic schools, especially among the Western Christians, who, as late as the 6th century, made use of the heathen schools, and had never established catechetical schools even at Rome.

CATECHISM, a form of instruction by question and answer, especially in Christian doctrine by that method; and not the instruction only, but the book in which the questions and answers are contained. The catechetical school of Alexandria was an institution designed to instruct pagans in the doctrines of the Christian Church (2d century). Its founder, Pantenos, was a Greek convert deeply learned in the Grecian philosophy and in the Hebrew Scriptures. Among his disciples was Titus Flavius Clemens, who became his successor as head of the school; and to Clemens (Clement of Alexandria) succeeded the illustrious Origen, who, at the early age of 18, was deemed worthy to be named to so responsible a post.

The catechetical instruction given by these masters of the Alexandrine school was conveyed rather in the form of lectures than in that of question and answer. The more familiar instruction given to catechumens in the early Church was of the same nature, but more simple and elementary. In the latter half of the 4th century Saint Cyril, bishop of Jerusalem, composed 23 lectures, or in Greek *katacheseis,* of which 18 were addressed to postulants for baptism (catechumens) and five to the neophytes after their baptism. These latter he called mystagogic catacheses, or instruction in the mysteries of Christianity. They are of a more popular character than the catacheses of the Alexandrines and are believed to be the first example of a popular compendium of the Christian doctrines.

In the Roman Catholic Church the Catechism of the Council of Trent, or Roman Catechism or *Catechismus ad Parochos* (Catechism for Parish Priests) is addressed especially to pastors and others having cure of souls, suggesting to them the manner of expounding Christian doctrine and of enforcing the precepts of Christian morality in their sermons from the pulpit and in conveying religious instruction to the young. It is also designed as a basis and model in composing short expositions of Christian doctrine for popular use among the laity. The Catechism of the Council of Trent was first published in 1566 in Latin and formed a considerable volume, 500 pages 8vo. A decree of the Council of Trent ordered all bishops to "take care to have the Catechism faithfully translated into the vernacular language and expounded to the people by all pastors." Translations were accordingly made into Italian, French, Spanish and German. The first English translation was not published till 1829. It is a large octavo, closely printed, of over 400 pages. The work possesses high authority, but not the highest; it does not rank with the creeds of the Church or with the canons and decrees of councils or the dogmatic definitions of Popes.

All the principal divisions of Protestantism — the Anglican Church and its offshoots, the Lutheran and Calvinistic Churches, the Presbyterians, Methodists and Baptists — have catechisms. Many of these Protestant catechisms, as the catechism of Luther, the Calvinist of Geneva, the Westminster Larger and Shorter catechisms, the Catechism of the Church of England, possess in their several Churches an authority equal or comparable to that of their several creeds or confessions of faith.

CATECHU, an earthy or resin-like substance, used in dyeing and calico-printing, and in medicine as an astringent. It is obtained by boiling the leaves, wood and fruit of certain plants growing in India and other Eastern countries (notably the *Acacia catechu*) and concentrating the extract by evaporation until it will solidify. Catechu (known also in the trade as "cutch") consists mainly of catechutannic acid, which is soluble in cold water, and catechin, which is insoluble in cold water, but soluble in hot water. In medicine catechu is of service because of the tannin that it contains. It acts as an astringent and is serviceable in diarrhœa and dysentery. Catechu is also used in lozenges for affections of the mouth and throat.

CATECHUMEN, a person who is under instruction and probation preparatory to admission to membership in the Christian Church through baptism. On the day of Pentecost and in the early days of the Church's mission the converts to the religion of Jesus Christ were admitted through baptism to fellowship in thousands at a time, without any preliminary inquiry into their dispositions, and without any instruction in the articles of Christian belief or the new obligations contracted by admission into the Christian body. But when the first enthusiasm of conversion had cooled doubtless many were found who "walked no more" in the way of the apostles and went back to their pagan or their Jewish beliefs and practices, or worse, who after two changes of religion lapsed into open contempt of all religion and of all morality. To guard against the scandal of such apostasies the Church provided a system of preliminary, graduated instruction and probation for those who desired admission to the Christian communion. The candidates for admission to the Church, to the body of the faithful (believers, *fideles, pistoi*) were called catechumeni (persons under instruction) and even in this class there were three or even four separate grades. There was the first grade, that of those who, having expressed a desire for admission, were put under instruction privately by some officer of the Church: this class was not admitted at all to the assemblies of the faithful. Those in the second grade, that of the *acouomenoi, audientes,* hearers, were admitted to the assembly for worship, but were required to withdraw after the reading of the stated passages from the evangelic and apostolic books and the sermon or exhortation by the bishop. Those of the third grade, the *gonyclinontes, genuflectèntes,* those "bending the knee," that is, who join in the prayers of the faithful, remained in the congregation till certain prayers in the liturgy were said and the bishop had pronounced his benediction. The fourth grade included all those who, having passed the first three, were to receive the rite

of baptism and thereby were to be admitted to full communion with the faithful on the next stated day for administration of that sacrament: these are the *photizomenoi,* instructed, or *competentes,* or *electi.* The first two grades are not recognised as two by all Church historians.

Such a term of preliminary instruction and probation was imperatively necessary in the ages of persecution, to save the Christian body from the scandal of apostasy on the part of converts who entered the Church either from unworthy motives, as, for example, to act as informers; or who entered without weighing the obligation they assumed to lead a holy life void of all offense, and who disgraced their Christian profession by their disorderly lives. The institution of the catechumenate persisted after the peace of the Church was proclaimed by the first Christian emperor, and indeed the need of it was greater now that the profession of the Christian religion seemed the gateway to honor and power in the state instead of to martyrdom. The press of candidates for admission to the Church was great; and even the children of believers like converts from the pagan religion had to pass through the catechumenal grades. Out of this grew a great abuse and a great scandal. Men who sought admission to the Church for other reasons than a desire to lead a Christian life would enter themselves as catechumens, postulants, and would continue in that grade for an indefinite period not pledging themselves to observance of the law of Christ and the Church till the end of their life was at hand. Nor was it the converts from paganism alone who thus deferred baptism, as Constantine did, but the children of Christian parents often followed their example. Yet the motive for deferring baptism was not always a desire to evade the obligations of the Christian profession; in very many instances the delay was prompted by a conscientious scruple lest the baptized person falling from grace afterward should commit a sin that could never be condoned: among illustrious men who for a time acted on this scruple are numbered even doctors of the Church — Saints Ambrose, Gregory of Nazianzus, Augustine.

The ancient church edifices provided for the separation of the catechumens from the faithful that were in full communion. In the ancient church of Saint Clement in Rome, the body of the building is divided off by stone constructions into the *presbyterium,* chancel or sanctuary for the clergy at the eastern end, a middle compartment for the faithful in full communion — the galleries here being reserved for the women — and in the western end, or front, a much larger compartment of the nave for the catechumens.

CATEGORY (Gk. *κατηγορία*, an accusation), in logic and philosophy, one of the great natural divisions into which all conceivable objects fall. The ancients, following Aristotle, generally made 10 categories. Under the first all substances are comprised, and all accidents or attributes under the last nine, namely, quantity, quality, relation, action, condition, time, place, situation and acquired nature. A somewhat similar arrangement is to be found in the works of the Hindu philosopher Kavâda. This arrangement, however, is now obsolete. Descartes thought that all nature may be better considered under the seven divisions: spirit, matter, quantity, substance, figure, motion and rest. Plato admitted only five categories — substance, identity, diversity, motion and rest. The Stoics held four — subjects, qualities, independent modes, relative modes. Plotinus applied to the intelligible world the categories the One, motion, rest, identity and difference; to the world of sense the categories being, relation, quantity, quality and motion. Kant's list of categories is: 1. Categories of quantity: unity, plurality, universality. 2. Categories of quality: reality, limitation, negation. 3. Categories of relation: substantiality, causality, reciprocity. 4. Categories of modality: possibility, actuality, necessity. Kant considered that these categories corresponded to the different classes of judgment, but it was soon realized that the basis these give to the categories of the list is merely specious. In accordance with his custom of deducing matter of the most concrete nature by a priori methods, Hegel calls a large number of notions categories which other philosophers would regard as grounded in experience. Mill substitutes for Aristotle's set of categories the classification of all things into feelings, minds, bodies and temporal or qualitative relations between feelings. In the philosophy at the present day, though there are certain writers and schools who make a considerable use of the process of classifying things in categories — Hussere and Hartmann, for example — there is much less discussion of categories than there used to be. This is due to the fact that we are coming to see that the taking of an inventory of the universe is one of the least of the tasks of metaphysics, which is rather concerned with the analysis of the relational structure of things. However, even in a view of the world which regards it as a relational structure, there are bound to be a number of *summa genera,* such as class, relation, proposition, etc. For a discussion of the category-system of a view of this type, see LOGIC, SYMBOLIC. Consult the works of the various writers mentioned, and especially von Hartmann, E., 'Kategorienlehre' (1896).

NORBERT WIENER, Ph.D.,
Editorial Staff of The Americana.

CATEL, Franz, German artist: b. Berlin, 22 Feb. 1778; d. Rome, 19 Dec. 1856. His earliest efforts were wood cuts for illustration of books. He then painted in oil and water colors, and took up his abode in Rome in 1812. Overbeck, Schadow and Cornelius gave him much encouragement, and he painted historical and genre pieces and landscapes, in which last-named department of his art he was especially successful. He became a member of the Academy of Berlin (1806); and professor of the Royal Academy (1841). During a residence in Sicily, about the year 1818, he painted a large number of views of Mount Ætna, and other prominent places on the island. He directed his fortune to be invested for the benefit of poor artists.

CATENARY, the curve assumed by a perfectly flexible chain of small links supported at both ends and allowed to hang freely under the influence of gravitation between supports. This is the simple catenary. The geometrical cate-

nary supposes the curve of a perfectly flexible, inextensible and infinitely fine cord of infinitesimal weight hanging at rest between two points of suspension. The equation of the catenary is expressed thus: $y = \frac{1}{2} h \left(\frac{x}{e^h} + -\frac{x}{e^h}\right)$. The cables of a suspension bridge hang in catenaries before any of the other parts of the bridge are attached. The effect of the weight of the roadway, etc., is to draw the cables into curves more nearly approaching the parabola.

CATERPILLAR, the larva of a moth or butterfly. The body is long and cylindrical, consisting, besides the head, of three thoracic and 10 abdominal segments, the last one forming the suranal plate. The three pairs of thoracic legs are solid, horny and jointed, while the supports of the abdominal segments, of which there may be five pairs, are soft and fleshy. Caterpillars are very voracious, the digestive canal being very large. The American silk-worm (*Telea polyphemus*), at the end of its life as a caterpillar, has eaten not less than 120 oak leaves weighing three-fourths of a pound; its food, taken in 56 days, equals in weight 86,000 times the primitive weight of the worm. The jaws of caterpillars are large, black, horny appendages, and are toothed on a cutting edge so as to pass through a leaf somewhat like a circular saw. The eyes are minute, simple eyelets, three or four on each side of the head, and only useful, probably, in distinguishing day from night. The silk is spun through the tongue-like projection (spinneret) of the under lip. It is secreted in two long sacs within the body. The thread is drawn out by the two fore feet, which are three-jointed and end in a single claw. The legs on the hind body, sometimes called prop-legs, are fleshy, not jointed, and end in a crown of hooks which curve outward, enabling the caterpillar to firmly grasp the edge of the leaf or a twig of its food-plant. Most caterpillars are more or less hairy or spiny, rendering them, when especially so, disagreeable to birds; besides this, they are bright colored, so that birds readily recognize them and waste no time over them, but search for the common green smooth-bodied ones, which are, however, so difficult of detection by the birds that plenty are left to become moths or butterflies. Certain caterpillars, as the currant-worm, though smooth-bodied, are brightly spotted; these, however, often have a disagreeable taste. The bright colors are thus danger signals, hung out to warn the birds and other enemies. (See LARVA). Consult authorities mentioned under BUTTERFLY, MOTH, INSECT, especially Holland, 'Butterfly Book' (New York 1898) and 'Moth Book' (New York 1903); also Elliott and Soule, 'Caterpillars and their Moths' (New York 1902; directions for breeding).

CATESBY, kāts-bĭ, **Mark**, English naturalist: b. probably in London about 1679; d. London, 23 Dec. 1749. He traveled in North America in 1710–19 and 1722–26, and published 'Natural History of Carolina, Florida and the Bahama Islands' (2 vols., 1731–43), 'British-American Flowers,' and a work on the fishes, reptiles and insects of the isle of Providence; and 'Migration of Birds' (1747). German translations of the first and last appeared at Nuremberg.

CATFISH, any of the fishes of the family *Siluridæ*. This large family is characterized by having the body naked or covered with bony plates, but without true scales. About the mouth there are two or more barbels, the longest of which are at the corners of the mouth. There is usually a stout, generally serrated, spine in front of the dorsal fin, and often another in front of each pectoral fin. These spines are likely to inflict considerable injury on the careless fisherman. There is what seems to be a poison-gland connected with the pectoral spine of some of the smaller species, and wounds are very painful. This is one of the most widely distributed families of fishes, and is especially abundant in South America and Africa. Most of them live in fresh waters. There are estimated to be about 1,000 species.

The catfish are sluggish in their movements, securing their prey rather by stratagem than by swiftness. They are bottom-feeders and indiscriminate, so that although, on account of their size and abundance, they constitute an important element in the fish food of the countries they inhabit, their flesh is not considered of high quality in taste. North and middle America contain 100 or more species, of which a third, perhaps, are to be found in the United States and Mexico. The majority are not of much importance, but some are of great local value. At the head of the commercial list stands the channel cats of the genus *Ictalurus*, which are found throughout the Mississippi Valley and Gulf States, and are caught in vast quantities not only for home use, but for export, as much as 2,000,000 pounds annually being dressed, packed in ice and shipped from Morgan City, La., the central mart of the Atchafalaya River fisheries, which are in operation from September to May. The method of capture is by "trot-lines" from a few yards to a mile long. The catfish move with the season's temperature of the water, going down stream in winter and up in summer. At the season of the spring floods they are carried over the swamps and adjacent lands, and thousands are caught by the shorter "brush" lines. There is a regular collecting service of tugs. The Louisiana species most taken is the chucklehead (*I. furcatus*), which loves sluggish waters. A more northerly species, ordinarily 20 to 25 pounds in weight, is the "blue" or "white" channel cat (*I. punctatus*), which thrives in the colder, swifter waters of the Tennessee, Cumberland and neighboring rivers, whose flesh is declared equal to that of the black bass. Both these have been acclimated in California. The largest of the American species is the great fork-tailed Mississippi cat (*I. lacustris*), which inhabits all the lakes and big rivers from the Saskatchewan and Great Lakes to Florida and Texas, and reaches a weight of 150 pounds or more. The so-called Potomac River cat (*A. catus*) is the one most familiar in the east, since it abounds from the Delaware River to Texas, but is most common in the waters of Chesapeake Bay and southward to Florida. It is next in commercial value to the Great Lakes fish. It has a very wide head and large mouth, but seldom exceeds two feet in length. The smaller yellow cat (*A. natalis*) and other

species of this genus are numerous in the interior, but not of great importance. (See BULLHEAD). The mud cat or goujon (*Leptope olivaris*) is a slender pike-like fish with a very large, wide head and mouth, and thick skin, which lives in the sluggish rivers of the Southern States. It is sometimes five feet long and 100 pounds in weight, but is most repulsive in appearance; its flesh, however, is excellent, and is often sold, dressed, for that of the favorite western channel cat. Other genera and species go by such names as horned pouts, mud-cats, stone-cats, mad toms, etc., and will be found elsewhere described, as well as many foreign species of interest and value.

Consult, besides general works, Jordan and Evermann, 'Food and Game Fishes of America,' and the publications of the United States Fish Commission.

CATGUT is made from the intestines of different quadrupeds, particularly those of sheep, but never from those of the cat. The manufacture is chiefly carried on in Italy and France. The texture from which it is made is that which anatomists call the muscular coat, which is carefully separated from the peritoneal and mucous membranes. After a tedious process of steeping, scouring, fermenting, inflating, etc., the material is twisted, rubbed with horse-hair cords, fumigated with burning sulphur to improve its color and dried. Cords of different size and strength and delicacy are obtained from different domestic animals. The intestine is sometimes cut into uniform strips with an instrument made for the purpose. To prevent offensive effluvia during the process, and to get rid of the oily matter, the French make use of an alkaline liquid called *eau de javelle*. Catgut for stringed instruments, as violins and harps, is made principally in Rome and Naples. For the smallest violin strings three thicknesses are used; for the largest seven; and for the largest bass-viol strings 120. It is well known that the membranes of lean animals are tougher than those in a high-fed condition, and there can be no doubt that from the lean and small-sized Italian sheep strings superior to all others are produced. In Naples, whence the best treble strings, commonly called "Roman," are obtained, there are large manufactories of this article. Catgut is also used for surgical sutures and for bow-strings.

CATHA, a genus of plants belonging to the order *Celastraceæ*, or staff-tree family. The species are mostly natives of Africa, forming small shrubs, sometimes with spiny branches. *Catha edulis* is a native of Arabia, and from the leaves the Arabs make a beverage possessing properties analogous to those of tea or coffee. Under the name of *kât* or *cafta*, the leaves form a considerable article of commerce among the natives. Chewed, they produce wakefulness and hilarity of spirits.

CATHARI, the name given to themselves by the adherents of numerous heretical sects, undoubtedly of Gnostic and Manichean origin, which swarmed in western Europe, and particularly in northern Italy and southern France in the 12th century. At that period society had much advanced in wealth and power, which brought their concomitant vices. There were many abuses prevalent in the Church, and some of the clergy led scandalous lives. The numerous heretical sects won adherents by violently and indiscriminately denouncing the entire hierarchy, from the Pope down to the monastic orders; but their tirades were not more emphatic than the philippics launched against the same scandals by sincere Catholics, their contemporaries, such as Saint Bernard, Saint Hildegarde, Saint Malachi, archbishop of Armagh, and others. But while these sought to procure the eradication of the current abuses by a reformation from within the Church, the Cathari (Gr. *katharos*, Lat. *mundus, purus,* and *puritanus,* pure, clean) aimed at nothing short of the total destruction of the dominant religion, of its whole system of belief and even of its moral teaching. For not only were the sects styled Cathari (including a host of offshoots of eastern Manicheism), heretics and reformers, but in their inner circles, dualists, believers in the existence of two supreme principles, the one a good principle, God, and the other an evil principle, the creator of the material world. But open profession was not made of this tenet; it was communicated only to the inner circle in the several Manichean sects, to the elect ones, the *perfecti,* but withheld from the mass of their followers, the *credentes,* the faithful vulgar. To these latter and to outsiders the adepts of the *arcana* of catharism made profession of being strictly reformers of a corrupt ecclesiastical system, and of profound regard for the letter and spirit of the moral law as taught in the apostolic writings. As already said, they enthroned the evil principle as creator of the physical universe; they believed in the divine mission of Jesus Christ, the Son of God, that is, of the good principle; but with the Docetæ they denied that the Son of God had assumed human nature really, and held that his humanity was phantasmal only. In conformity with their tenet of a supreme principle of good and a supreme principle of evil, the initiates condemned as works of the flesh the sacraments of the Church as a whole, and looked on the contract of marriage as sinful. They held absolute predestination: that all men belong to one or other of two classes, those who will infallibly be saved, and those who cannot possibly attain holiness: hence their doctrine that an infant dying immediately after birth, if it belongs to the class of those predestined to be lost, is punished as is Judas in hell. They dared not confess that on their principles the elect cannot lose the divine favor by sin; but they did teach that repentance is of no account, and that the sins of the people are forgiven by the rite (*consolamentum*) of laying on hands. This honor was only a concession to the prejudices of the ignorant vulgar: the *perfecti,* the initiates of the *arcana* of Catharism held themselves to be superior to the moral law.

CATHARINE, the name of several Christian saints: 1. SAINT CATHARINE OF ALEXANDRIA, a virgin of royal descent in Alexandria, who publicly confessed the Gospel at a sacrificial feast appointed by the Emperor Maximinus, and was therefore put to death, after they had vainly attempted to torture her on toothed wheels, 307 A.D. Hence the name of Catharine wheel (q.v.). No less than 50 heathen philosophers sent by the Emperor to convert her in prison were themselves converted by her win-

ning eloquence; whence she is the patroness of philosophers and learned schools. Having steadily rejected all offers of earthly marriage, she was taken in vision to heaven, where Christ plighted his troth to her with a ring. This subject has been a favorite one with many artists (as signifying the union of the redeemed soul with Christ); the Christ being usually represented as an infant. It has been suggested that the attributes of the unhistorical Saint Catharine seem to have been derived from those of the actual Hypatia, a heathen who suffered death at the hands of Christian fanatics. Saint Catharine's festival falls on 25 November. 2. SAINT CATHARINE OF SIENA, one of the most famous saints of Italy, was the daughter of a dyer in Siena, and was born there in 1347. While yet a child she practised extraordinary mortifications and devoted herself to perpetual virginity. She became a Dominican, and therefore afterward a patron saint of the Dominicans. Her enthusiasm converted the most hardened sinners, and she was able to prevail upon Pope Gregory XI for the sake of the Church to return from Avignon to Rome. She was given, it was said, extraordinary tokens of favor by Christ, whose stigmata were imprinted upon her body. She wrote devotional pieces, letters and poems, an edition of which is Tomasseo's (Florence 1860). Her festival falls on April 30. 3. SAINT CATHARINE OF BOLOGNA (1413–63), festival 9 March, and SAINT CATHARINE OF SWEDEN (d. 1481; festival 22 March), are of less note.

CATHARINE, Saint, Order of, the name of two organizations of very different character: (1) The Knights of Saint Catharine on Mount Sinai, an ancient military order, instituted for the protection of the pilgrims who came to visit the tomb of Saint Catharine on this mountain. (2) An organization in Russia, constituting a distinction for ladies, and instituted by Catharine, wife of Peter the Great, in memory of his signal escape from the Turks in 1711.

CATHARINE I, Empress of Russia: b. Ringen, near Dorpat, Livonia, 15 April 1684; d. Saint Petersburg, 17 May 1727. The early history of this remarkable woman is uncertain. According to some accounts she was the daughter of a Swedish officer named Rabe, who died shortly after she was born; according to others her father was a Roman Catholic peasant. She at first bore the name of Martha and entered the service of a clergyman named Glück, at Marienburg, who caused her to be instructed in the Lutheran religion. Here she was married to a Swedish dragoon. But a few days after he was obliged to repair to the field, and the Russians, within a short period, took Marienburg in 1702. Martha fell into the hands of General Tcheremetieff, who relinquished her to Prinz Mentchikov. While in his possession she was seen by Peter the Great, who made her his mistress. She became a proselyte to the Greek Church and assumed the name of Catharine Alexiewna. In 1708 and 1709 she bore the Emperor the Princesses Anna and Elizabeth, the first of whom became the Duchess of Holstein by marriage and mother of Peter III. The second became Empress of Russia. In 1712 the Emperor publicly acknowledged Catharine as his wife. She was subsequently proclaimed Empress, and crowned in Moscow in 1724. Besides the daughters above named she bore the Emperor five more children, all of whom died early. The Princesses Anna and Elizabeth were declared legitimate. When Peter, with his army, seemed irreparably lost on the Pruth in 1711 Catharine endeavored to win over the grand vizier; and having succeeded, by bribing his confidant with her jewels, she disclosed her plan to the Emperor, who gave it his approbation, and was soon relieved. She afterward received many proofs of the gratitude of her husband. Peter even deemed her worthy of being his successor. But in the latter part of 1724 she fell under his displeasure. Her chamberlain, Moens, with whom she was suspected of being on too intimate terms, was beheaded on pretense that he had been bribed by the enemies of Russia. Mentchikov, who had always manifested much attachment to her, had now been in disgrace for some time and Peter had very frequent attacks of bodily pain, with intervals only marked by dreadful explosions of rage. These circumstances made Catharine's situation critical and her anticipations of the future must have been the more melancholy, as the Emperor had uttered some threats of a change in the succession to her disadvantage. To prevent such an event she applied to Mentchikov; and by the prudence of Jaguschinski a reconciliation was effected with the Emperor. The Empress and the favorite were laboring to confirm their improving prospects when Peter the Great died, 28 Jan. 1725. Catharine, Mentchikov and Jaguschinski considered it necessary to keep the death of the Emperor a secret until, by judicious arrangements, they had secured the succession of the throne to the Empress. Theophanes, archbishop of Plescow, swore before the people and troops that Peter on his death-bed had declared Catharine alone worthy to succeed him in the government. She was then proclaimed Empress and autocrat of all the Russias and the oath of allegiance to her was taken anew. At first the Cabinet pursued the plans of Peter, and, under Mentchikov's management, the administration was conducted with considerable ability. But the pernicious influence of favorites was soon felt and great errors crept into the administration. Catharine died suddenly, her death being probably hastened by excess in the use of ardent spirits. Consult Lavisse and Rambaud, 'Histoire générale' (Vol. VII, Paris 1896), and Schuyler, 'Peter the Great' (New York 1884).

CATHARINE II, Empress of Russia: b. Stettin, 2 May 1729; d. Saint Petersburg, 17 Nov. 1796. She was a daughter of the Prince of Anhalt Zerbst and her name was originally Sophia Augusta. The Empress Elizabeth chose her for the wife of Peter, her nephew, whom she appointed her successor. The young Princess accompanied her mother to Russia, where she joined the Greek Church and adopted the name of Catharine Alexiewna, given to her by the Empress. The marriage was celebrated 1 Sept. 1745. It was not a happy one, but Catharine found relief in the improvement of her mind. She was endowed with uncommon strength of character; but the ardor of her temperament and the ill treatment of her husband led her into errors which had the most injurious influence on her whole political life. In January 1762 the Empress Elizabeth died and

Peter III ascended the throne. He lived in the greatest dissipation, and on such intimate terms with a lady of the court, named Elizabeth Woronzoff, that it was generally thought that he would repudiate Catharine and marry his mistress. The Empress, therefore, was obliged to take measures for her personal security. At the same time Peter grew continually more and more unpopular with his subjects, which led to a conspiracy, at the head of which were the hetman, Count Rasumowski, Count Panin, the enterprising Princess Daschkoff and a young officer of the guards, Gregory Orloff. All those who were dissatisfied, or who expected to gain by a change, joined this conspiracy. Panin and the greater part of the conspirators were actuated only by the desire to place the youthful Paul on the throne, under the guardianship of the Empress and a council of the empire. But this plan was changed through the influence of the Orloffs. The guards were the first to swear allegiance to the Empress on her presenting herself to them at Peterhof on the morning of 9 July 1762; and Alexei Orloff prevailed on Teplow, afterward appointed senator, to read at the Kazan Church, instead of the proclamation of the conspirators in favor of the young Prince, one announcing the elevation of Catharine to the throne. Peter died a few days after in prison. The accusation against Catharine of having contributed to hasten this event is without foundation. The young, ambitious Princess, neglected by her husband, whom she did not respect, remained passive on the occasion, yielded to circumstances which were, it is true, propitious to her, and consoled herself for an event which she could not remedy. She knew how to gain the affections of the people by flattering their vanity; showed great respect for their religion; caused herself to be crowned at Moscow with great pomp; devoted herself to the promotion of agriculture and commerce and the creation of a naval force; improved the laws; and showed the greatest activity in the administration of the internal as well as the external affairs of Russia. A year after her ascension to the throne she forced the Courlanders to displace their new Duke, Charles of Saxony, and to recall Biron, who was extremely odious to the nobles. After the death of Augustus III, King of Poland, she was the means of Stanislaus Poniatowski's being crowned at Warsaw. But while she was forcing this king on the Poles, the number of the malcontents in her own empire increased, and several attempts against her life were made at Saint Petersburg and Moscow. The young Ivan was the person to whom the hopes of the conspirators were directed; but his sudden death at the fortress of Schlüsselburg overthrew the plans of the disaffected. After this the court of the Empress was only disturbed from time to time by intrigues, in which gallantry and politics went hand in hand, and which had no other object than to replace one favorite by another. In the midst of pleasure and dissipation Catharine did not neglect the improvement of the laws. Deputies from all the provinces met at Moscow. The Empress had herself prepared instructions for their conduct, which were read at the first session; but it was impossible for so many different nations to understand each other, or to be subject to the same laws. Catharine, who presided at the debates, and received from the assembly the title of mother of the country, soon dismissed the discordant legislators. About this time France formed a party in Poland against Russia; but these attempts only served to accelerate Catharine's plans. The war to which the Porte was instigated had the same result. The Turks were beaten. The Russian flag was victorious on the Greek seas; and on the banks of the Neva the plan was formed of re-establishing the republics of Sparta and Athens as a check to the Ottoman power. The advancement of Austrian troops into Poland inspired Catharine with the desire to aggrandize herself in this quarter. She therefore entered into an agreement for the division of the country with the courts of Berlin and Vienna in 1772, by which the governments of Polotzk and Mohilev fell to her share, and she ensured to herself exclusive influence in Poland by undertaking to guarantee the Polish constitution. At the same time she abandoned all her conquests, with the exception of Azoph, Taganrog and Kinburn, in the peace with the Porte, concluded at Kainardschi in 1774, but secured to herself the free navigation of the Black Sea, and stipulated for the independence of the Crimea. By this apparent independence the Crimea became, in fact, dependent on Catharine. This peace was as opportune as it was advantageous to Russia; for in the third year of the war Moscow and several other cities were desolated by the plague; and about the same time an adventurer named Pugatscheff, assuming the name of Peter III, had excited a revolt in several provinces of eastern Russia, which was soon suppressed. At this time Potemkin exercised an unlimited influence over the Empress. In 1784 he succeeded in conquering the Crimea, to which he gave its ancient name of Tauris, and extended the confines of Russia to the Caucasus. Catharine upon this traversed the provinces which had revolted under Pugatscheff, and navigated the Volga and Dnieper, taking greater interest in the expedition, as it was attended with some danger. She was desirous, likewise, of seeing Tauris. Potemkin turned this journey, which took place in 1787, into a triumphal march. Throughout a distance of nearly 1,000 leagues nothing but feasts and spectacles of various kinds were to be seen. Palaces were raised on barren heaths, to be inhabited for a day. Villages and towns were built in the wildernesses, where a short time before the Tartars had fed their herds. An immense population appeared at every step — the picture of affluence and prosperity. A hundred different nations paid homage to their sovereign. Catharine saw, at a distance, towns and villages, of which only the outward walls existed. She was surrounded by a multitude of people, who were conveyed on during the night, to afford her the same spectacle the following day. Two sovereigns visited her on her journey — the King of Poland, Stanislaus Augustus, and the Emperor Joseph II. The latter renewed his promise, given at Saint Petersburg, to assist her in her projects against the Turks. The result was a new Turkish war, which by the Peace of Jassy (1792), ended not less favorably for Russia than the first. The power of Russia was also increased by the war with Sweden

which terminated in 1790, and by the last two partitions of Poland and the incorporation of Courland. Catharine took no part in the war against France, though she broke off all connection with the French republic, actively assisted the emigrants, and entered into an alliance with England against France. She likewise made war against Persia, and, as some historians assure us, entertained the project of destroying the power of the English in Bengal, when a fit of apoplexy put an end to her life.

Catharine II has been equally censured and praised. With all the weakness of her sex, and with a love of pleasure carried to licentiousness, she combined the firmness and talent of a powerful sovereign. Two passions were predominant with her until her death, love and ambition. She was never without her favorite, yet she never lost sight of her dignity. She was distinguished for activity, working with her ministers, writing letters to Voltaire and Diderot, and signing an order to attack the Turks, or to occupy Poland, in the same breath. She favored distinguished authors, and was particularly partial to the French. At Paris she had a literary agent (Baron Grimm). She several times invited Voltaire to her court, proposed to D'Alembert to finish the 'Encyclopædia' at Saint Petersburg, and to undertake the education of the Grand Duke. Diderot visited her at her request, and she often allowed him the privilege of familiar conversation with her. By these means she gained the favor of the literati of Europe, who called her the greatest of rulers; and, in fact, she was not without claims to this title. She protected commerce, improved the laws, dug canals, founded towns, hospitals and colleges. Pallas and others traveled at her expense. She endeavored to put a stop to the abuses which had crept into the administration of the different departments of government; but she began without being able to finish. Civilization advanced but slowly in Russia under her reign; and her anxiety to enlighten her subjects ceased when she began to entertain the idea that the French Revolution had been brought about by the progress of civilization. Laws, colonies, schools, manufactures, hospitals, canals, towns, fortifications, everything was commenced, but frequently left unfinished for want of means. Consult Bilbasoff, 'Geschichte Katharina II' (Berlin 1893); Brückner, 'Katharina die Zweite' (ib. 1883); Bury, 'Catharine II' (New York 1900); Castara, 'Vie de Catharine II' (1796); Herzen, 'Mémoires de l'Impératice Catharine II' (1859); Tannenberg, 'Leben Catherinens II' (1797); Hötzsch, "Catharine II" in 'Cambridge Modern History' (Vol. VI, New York and London 1906); Lavisse and Rambaud, 'Histoire générale' (Vol. VII, Paris 1896); Waliszewski, 'The Romance of an Empress, and the Story of a Throne' (London 1895).

CATHARINE OF ARAGON, Queen of England, the youngest daughter of Ferdinand of Aragon and Isabella of Castile: b. Alcalá de Henares, Spain, 15 Dec. 1485; d. Kimbolton, Huntingdonshire, 7 Jan. 1536. In 1501 she was married to Arthur, Prince of Wales, son of Henry VII. Her husband dying about five months after, the King, unwilling to return her dowry, caused her to be contracted to his remaining son, Henry, and a dispensation was procured from the Pope for that purpose. In his 15th year the Prince made a public protest against the marriage; but at length yielding to the representatives of his council, he consented to ratify the contract, and on his accession to the throne in 1509 was crowned with her. The inequality of their ages and the capricious disposition of Henry were circumstances very adverse to the durability of their union, and it seems surprising that Catharine should have acquired and retained an ascendancy over the affections of the King for nearly 20 years. The want of male issue, however, proved a source of disquietude to him, and scruples, real or pretended, at length arose in his mind concerning the legality of their union, which were greatly enforced by a growing passion for Anne Boleyn, one of the Queen's maids of honor. He made application to Rome for a divorce from Catharine. But all that Henry could obtain at Rome was a promise to investigate the case. Catharine, meanwhile, conducted herself with gentleness and firmness, and could not in any way be induced to consent to an act which would render her daughter illegitimate, and stain her with the imputation of incest. Being cited before the papal legates, Cardinals Wolsey and Campeggio, in 1529, she declared that she would not submit her cause to their judgment, but appealed to the court of Rome; which declaration was declared contumacious. His failure to secure the sanction of the Pope to the divorce induced the King to decide the affair for himself; and the condemnation of his conduct expressed on this occasion by the court of Rome provoked him to throw off his submission to it, and declare himself head of the English Church — an act of royal caprice and of great importance in English history. In 1532 he married Anne Boleyn; upon which Catharine, no longer considered Queen of England, retired to Ampthill in Bedfordshire. Cranmer, now raised to the primacy, pronounced the sentence of divorce, notwithstanding which Catharine still persisted in maintaining her claims. Shortly before her death she wrote a letter to the King, recommending their daughter (afterward Queen Mary) to his protection, praying for the salvation of his soul, and assuring him of her forgiveness and unabated affection. The pathos of this epistle is said to have drawn tears from Henry. He had never presumed to call the virtues of his injured wife in question, and she certainly acted throughout with eminent dignity and consistency. Several devotional treatises have been attributed to Catharine which belong to Queen Catharine Parr.

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CATHARINE OF BRAGANZA, brā-gän'zā, wife of Charles II, King of England,

and daughter of John IV, King of Portugal: b. Villa Viçosa, Portugal, 25 Nov. 1638; d. Portugal, 31 Dec. 1705. In 1662 she married Charles II, in whose court she long endured all the neglect and mortification to which his dissolute conduct necessarily exposed her, and which became still more galling from her having no children; still she conducted herself with great equanimity, and after the death of Charles received much attention and respect. In 1693 she returned to Portugal, where, in 1704, she was made regent by her brother, Don Pedro, whose increasing infirmities rendered retirement necessary. In this situation Catharine showed considerable abilities, carrying on the war against Spain with great firmness and success. Consult Strickland, 'Lives of the Queens' (Vol. IV, London 1888); Jesse, 'Memoirs of the Court of England' (Vol. III, London 1876); Ranke, 'History of England, Principally in the Seventeenth Century' (Oxford 1875); Davidson, 'Catharine of Bragança' (London and New York 1908).

CATHARINE OF FRANCE. See CATHARINE OF VALOIS.

CATHARINE HOWARD, Queen of England. See HOWARD, CATHARINE.

CATHARINE DE MEDICI, mā'dī-chē, Queen of Henry II of France: b. Florence 1519; d. Blois, France, 5 Jan. 1589. She was the only daughter of Lorenzo de Medici, Duke of Urbino, and the niece of Pope Clement VII. Francis I consented that his son, Henry, should marry her only because he did not believe she ever would ascend the throne, and because he was in great want of money, with which Lorenzo could furnish him. The marriage was celebrated at Marseilles in 1533. She was the mother of four sons, of whom three became kings of France in her own lifetime. They were Francis II, 1559–60; Charles IX, 1560–74; and Henry III, 1574–89. Catharine was equally gifted with beauty and talents, and had cultivated her taste for the fine arts in Florence; but at the same time imbibed the perverted principles of politics then prevailing in Italy. Catharine's ambition was unbounded. She sacrificed France and her children to the passion for ruling; but she never aimed steadily at one great end, and had no profound views of policy. The situation in which she was placed, on her arrival at the French court, gave her great opportunity to perfect herself in the art of dissimulation. She flattered alike the Duchess d'Etampes, the mistress of the King, and Diana de Poitiers, the mistress of her own husband, though these two ladies hated each other. From her apparent indifference she might have been supposed inclined to shun the tumult of public affairs; but when the death of Henry II in 1559 made her mistress of herself, she plunged her children in a whirl of pleasures, partly to enervate them by dissipation, partly from a natural inclination toward prodigality; and in the midst of these extravagances cruel and bloody measures were executed, the memory of which still makes men shudder. Her authority was limited under the reign of Francis II, her eldest son, who, in consequence of his marriage with the unfortunate Mary Stuart, was entirely devoted to the party of the Guises. Jealous of a power she did not exercise, Catharine then decided to favor the Protestants. If it had not been for her patronage, by which the ambition of the chiefs of the Huguenots was stimulated, the conflicting religious opinions in France never would have caused such lasting civil wars. Catharine felt herself embarrassed by this indulgence toward the innovators, when the death of Francis II placed the reins of government, during the minority of Charles IX, in her hands. Wavering between the Guises on one side, who had put themselves at the head of the Roman Catholics, and Condé and Coligny on the other, who had become very powerful by the aid of the Protestants, she was constantly obliged to resort to intrigues, which failed to procure her as much power as she might easily have gained by openness of conduct. Despised by all parties, but consoled if she could deceive them; taking arms only to treat, and never treating without preparing the materials for a new civil war, she brought Charles IX, when he became of age, into a situation in which he must either make the royal authority subordinate to a powerful party, or cause part of his subjects to be massacred, in the hope, at best a doubtful one, of subduing faction. The massacre of Saint Bartholomew was her work. She induced the King to practise a dissimulation foreign to his character; and as often as he evinced a disposition to free himself from a dependence of which he was ashamed, she knew how to prevent him, by the fear and jealousy which she excited in him by favoring his brother Henry. After the death of Charles IX Catharine became again regent of the kingdom, till the return of Henry III, then king of Poland. She contributed to the many misfortunes of his reign by the measures which she had adopted previously to its commencement, and by the intrigues in which she was uninterruptedly engaged. At her death, France was in a state of complete dismemberment. The religious contests were in reality very indifferent to her. The consequences she was not able to conceive. She was ready to risk life for the gratification of her ambition. She was equally artful in uniting her adherents, and in promoting dissension among her adversaries. To those who directed her attention to the prodigal expenditure of the public treasure, she used to say, "One must live." Her example contributed greatly to promote the corruption of morals which prevailed in her time. Her manners, however, were elegant, and she took a lively interest in the sciences and arts. She procured valuable manuscripts from Greece and Italy, and caused the Tuileries and the Hôtel de Soissons to be built. In the provinces, also, several castles were erected by her order, distinguished for the beauty of their architecture, in an age when the principles of the art were still unknown in France. She had two daughters, Elizabeth, married to Philip II of Spain in 1559, and Margaret of Valois, married to Henry of Navarre, afterward Henry IV. Consult Alberi, 'Vita de Caterina de' Medici' (Florence 1838); Balzac, 'Sur Cathérine de Medicis' (Paris 1864); Chéruel, 'Marie Stuart et Cathérine de Medicis' (id. 1858); Sichel, 'Catherine de' Medici and the French Reformation' (London 1905); 'The Later Years of Catharine de' Medici' (ib. 1908); Zeller, 'Cathérine de Medicis et les Protestants' (Paris 1889); La

Ferrière, 'Lettres de Catherine de Medicis' (1880–91).

CATHARINE PARR. See PARR, CATHARINE.

CATHARINE PAULOVNA, Queen of Würtemberg: b. 21 May 1788; d. 9 Jan. 1819. She was a daughter of Paul I of Russia, and in 1809 married George, Duke of Holstein Oldenburg. After his death in 1812, she accompanied her brother, Alexander, on his campaigns in Germany and France (1813–14), to Paris, London and the Congress of Vienna (1815), assisting him by her talents and resolute spirit. The marriage of her younger sister to the Prince of Orange is said to have been effected by her influence. In 1816 she married William, Crown Prince of Würtemberg, whose acquaintance she had made during her travels. During the famine of 1816 in that country she proved her benevolence by the formation of female associations and an agricultural society. She was active in promoting the education of the people.

CATHARINE OF VALOIS, văl'wä, Queen of England, youngest child of Charles VI and Isabella of Bavaria: b. Paris, 27 Oct. 1401; d. 3 Jan. 1438. In 1420 she was married to Henry V of England, who was then declared successor to the crown of France. To this prince she bore Henry VI, crowned in his cradle king of both countries. After the death of Henry, in 1422, Catharine went into retirement and privately married Owen Theodore, or Tudor, a Welsh gentleman of small fortune, but descended from the ancient British princes. By this marriage she had two sons, the eldest of whom, Edmund, Earl of Richmond, by a marriage with Margaret Beaufort, of the legitimated branch of Lancaster, became father of Henry VII and founder of the house of Tudor. Consult Strickland, A., 'Lives of the Queens of England' (Vol. III, London 1840); De Viriville, 'Histoire de Charles VII' (Vol. I, pp. 143, 187, 189, 218 et seq).

CATHARINE-WHEEL, a window or compartment of a window of circular form, sometimes with radiating divisions or spokes, used in mediæval buildings, called a rose, or marigold window. It is a memorial of Saint Catharine's martyrdom. The term is also applied to a kind of firework in the shape of a wheel, made to revolve automatically when lighted; a pin-wheel.

CATHARTIC, any remedy that will cause an increased discharge from the intestinal canal. For purposes of general description there are four classes of cathartics. These are mild cathartics, or laxatives; simple purges, drastic purges and hydragogues. Catharsis is accomplished either by increasing the amount of water in the intestines or by stimulating the movements of the intestines—peristalsis. The laxatives are water, sugar, honey, fruits, stringy vegetables, coarse bread, cassia fistula, sulphur, figs, etc.; these act either by giving bulk, stimulation of peristalsis, or by adding water, all of the sugars attracting water from the intestinal wall. The simple purges act usually by stimulating peristalsis. These are castor oil, cascara sagrada, rhubarb, aloes, senna, iris, podophyllum, leptandra, calomel, etc. The drastic purges stimulate peristalsis, and many of them cause a flow of water into the intestine. The simple purges in large doses are drastic. Gamboge, jalap, colocynth, scammony, croton oil and elaterium are drastic. Another class of cathartics are salty, and by osmosis attract water into the intestines and stimulate the motor activity of the intestines; they thus act as hydragogues and are termed the saline cathartics. Those most commonly used are epsom salts, rochelle salts, magnesium oxide, citrate, sodium phosphate, tartrate and bitartrate. Most of the mineral waters belong to this class of cathartic. In former times cholagogues were described as cathartics that "stirred up the liver secretions." It is now fairly well recognized that those drugs that stimulate peristalsis affect the gall bladder, causing it to empty itself more actively, and that the liver is unaffected. The only true hepatic stimulant that is now recognized is ox-gall. This is frequently employed as a cathartic. Abuse of cathartics is an evil above all description. It is almost safe to assert that the injudicious use of the many patent cathartic pills on the market is responsible for more intestinal trouble than any other agent. They teach people to be unduly occupied with their intestinal functions and work incalculable injury. See CONSTIPATION.

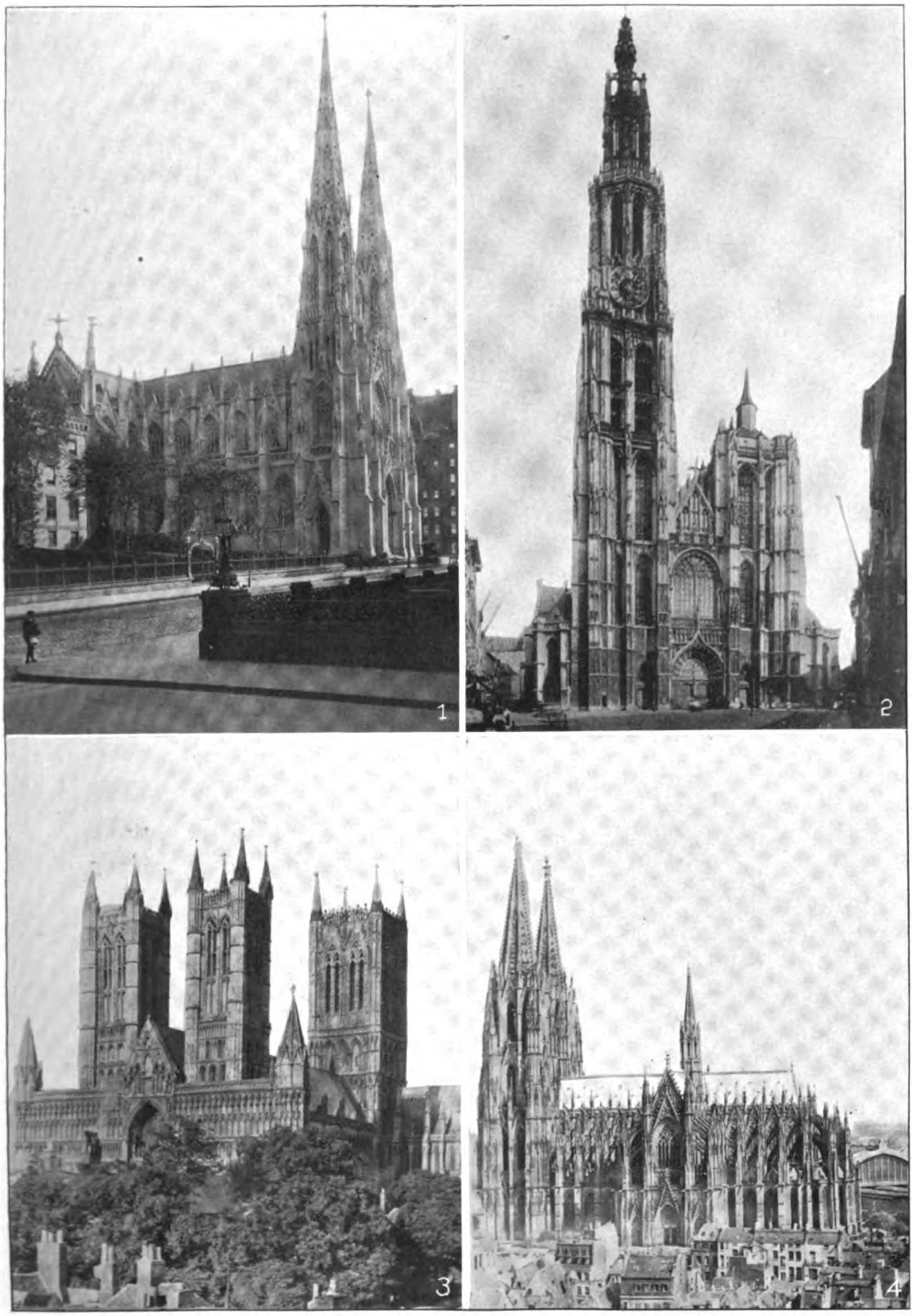
CATHARTIDÆ, the American vultures, a family of birds of the order *accipitres* or *Raptores,* differing from the more eagle-like Old World vultures (*Vulturidæ*) in having the beak comparatively slender, straight and blunt, the complete absence of a septum between the nostrils, the much more largely naked head and neck, and the weak feet with elevated hallux and but slightly curved claws. Altogether they are less predaceous birds, which feed exclusively on carrion or attack weakling animals. Five genera, each with but one or a few species, are found in America, more especially in the warmer parts. Among them are the carrion crow, the condor and the turkey buzzard (qq.v.).

CATHAY, kăth-ā', a name by which Marco Polo designated a part of Asia, probably North China.

CATHCART, Sir George, son of William Schaw Cathcart (q.v.): b. London, 12 May 1794; d. Inkerman Crimea, 5 Nov. 1854. He entered the Life Guards in 1810, accompanied his father as attaché to Russia, and subsequently acted as aide-de-camp to the Duke of Wellington at Waterloo. He served in Nova Scotia and the West Indies, quelled the rebellion in Canada in 1837, and was appointed in 1852 governor at the Cape of Good Hope, where he showed ability in subduing the Kaffir insurrection. On the outbreak of the Crimean War great things were expected of him, but he fell as divisional commander at Inkerman. He was the author of 'Commentaries on the War in Russia and Germany in 1812 and 1813' (London 1850).

CATHCART, William Schaw, EARL OF, English soldier and diplomatist: b. Petersham, England, 17 Sept. 1755; d. near Glasgow 16 June 1843. He studied at Dresden and Glasgow, then entered the army, and served with distinction first in the American war and afterward in the campaigns against the French

CATHEDRALS



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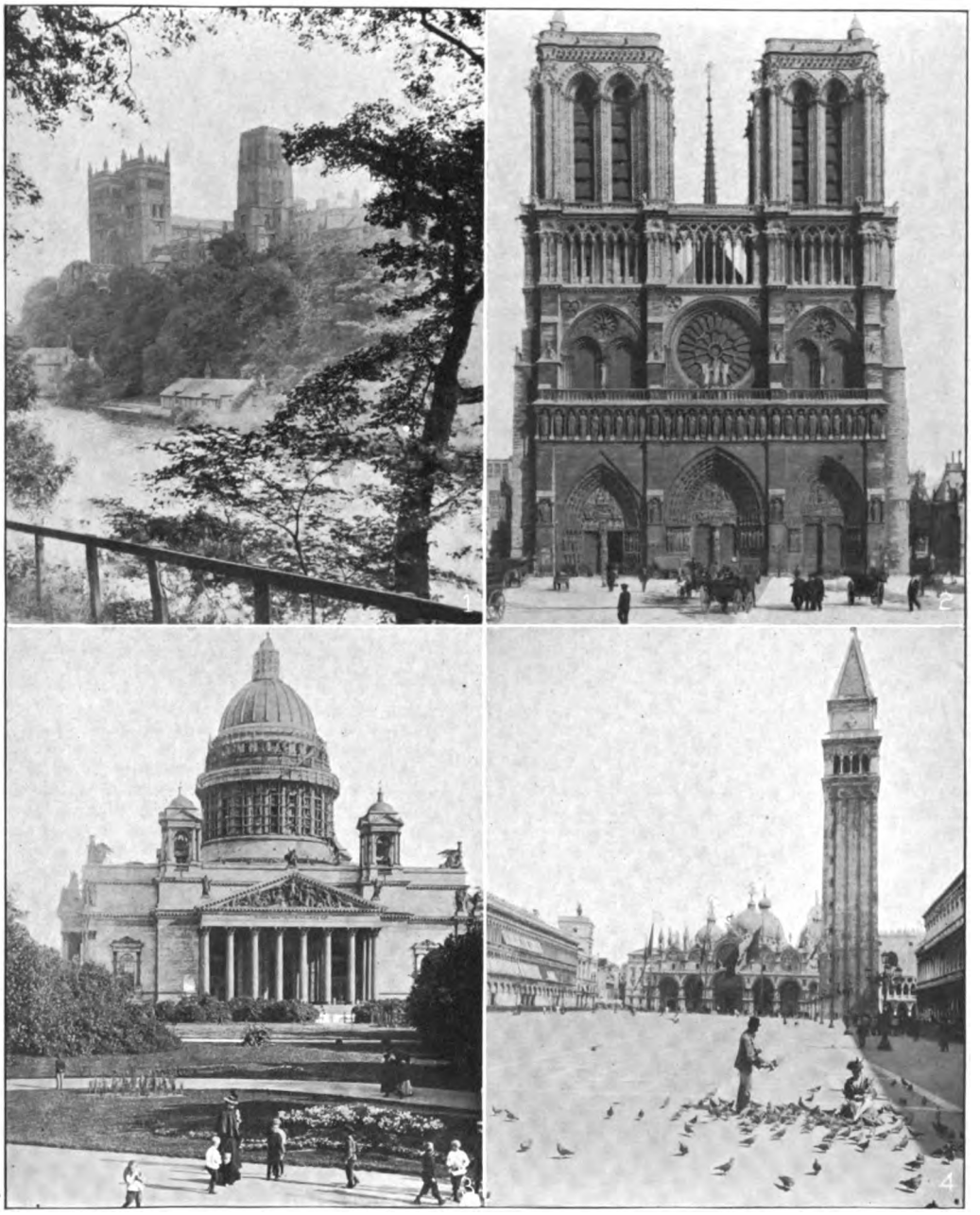
1 Saint Patrick's Cathedral, New York City
2 Antwerp Cathedral
3 Lincoln Cathedral
4 Cologne Cathedral

CATHEDRALS



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1 Durham Cathedral
2 Notre Dame, Paris
3 Saint Isaac's Cathedral, Petrograd
4 Saint Mark's Cathedral, Venice

republic in Flanders and Germany. In 1801 he was made lieutenant-general, and in 1803 commander-in-chief for Ireland. In 1807 he was appointed commander of the land forces in the expedition against Copenhagen, and was created a viscount for his services on this occasion. In 1812 he proceeded to Russia as Minister-Plenipotentiary, joined the Emperor Alexander at the headquarters of the Russian army and accompanied him through the campaigns of 1813–14. He entered Paris with the allied sovereigns, and was present at the Congress of Vienna. The same year he was created an earl. Subsequent to this he resided for several years at Saint Petersburg as Ambassador to the Russian court.

CATHEDRAL. See CATHEDRALS AND CHURCHES.

CATHEDRAL, The, a poem by James Russell Lowell, published in Boston in 1869. The particular cathedral which suggested the thought of the poem is that of Chartres.

CATHEDRAL PEAK, a peak of the Sierra Nevada range, situated in the northeastern part of Mariposa County, Cal., near lat. 37° 50′ N. It is of granite formation and contains the source of the Merced River. It is 11,000 feet high.

CATHEDRAL OF SAINT JOHN THE DIVINE. See CATHEDRALS AND CHURCHES.

CATHEDRAL SCHOOLS. All of the schools of western Europe were derived from bishop's schools (q.v.). The manifold duties of the bishop, however, which often caused his absence from his diocese, forced the control of the school to devolve on those members of the chapter who were bound to stationary residence. In the process of time, the cathedral school developed into three or sometimes four schools: the theological school, the music or song school, the choristers' school, a combined grammar and song school, and the grammar school itself, which became the cathedral school par excellence. These institutions were the first public schools of the Middle Ages; and continued their high importance in England down to the 18th century. They were open to all students, and taught the classics in general, together with the rhetoric and logic of the scholastic *trivium*. The four principal dignitaries as the schools were organized at the end of the 11th century throughout Europe were the dean, precentor, chancellor and sacrist or treasurer (in order of rank, generally). The head of the school was generally a master of arts. When the monastic cathedrals at Canterbury, Rochester, Durham, Worcester, Norwich, Ely and Carlisle were abolished in 1540, and replaced by secular canons, a master and an usher were added to each new grammar school; provision was made for the admission of fee students; and exhibits planned, to take the best scholars to the universities. This last provision was soon canceled. The monastic cathedral schools meanwhile suffered through lack of funds and eventually became annexed to some other charitable enterprise of the cathedral or died out altogether. When in 1863 the great inquiry into the secondary schools was conducted for the purpose of revival, the old monastic schools were entirely overlooked and arrangements were made for the extensive assistance of the newer secular cathedral schools from the funds of the ecclesiastical commissioners. Westminster, throughout the 17th and 18th centuries, conducted the best and most famous of public schools; York had the chief school of the north; Durham has been the most uniformly successful; Canterbury, for many years decadent, has increased recently; Norwich, Hereford and Ely have been fairly successful as local schools; Bristol and Chichester have declined notably. See ALMONRY SCHOOLS.

CATHEDRALS AND CHURCHES, the latter name derived from the Greek *κυριακος* Lord's House, the former from the Greek *καθεδρα*, a "seat." Thus, "to speak ex cathedra," is to speak as from a seat of authority. A cathedral city is the seat of the bishop of the diocese and his throne is placed in the cathedral church. From the early days of the Christian Church the bishop presided in the presbytery or assembly of priests. He was seated on a chair, a little higher than those of the others. The whole meeting of priests was called *cathedra;* and at a later period, when Christians were allowed to build churches, this name was applied to the episcopal churches. Besides the cathedral churches we find those distinguished as collegiate, conventual, parochial and abbey, according to the classification of the Roman Catholic Church. The governing body of an English cathedral is called the dean and chapter. The cathedral is commonly, though not invariably, the most important church building, architecturally speaking, in the diocese. Its usual form is the Latin cross. From the comparatively simple outline of the early Christian basilica has been evolved the complex cathedral structure of the Middle Ages. In its outline a typical cathedral exhibits nave, extending east and west, transepts, north and south, choir, retro-choir, and, sometimes, lady chapel. A tower rises where the transepts cross the nave. Two towers usually flank the western front, which contains a large rose window. But it must be borne in mind that in size and architectural style the cathedral is not necessarily superior to the other churches of a diocese. The dimensions of some of the abbey and parish churches are greater than those of some cathedrals. French cathedrals are distinguished by their great height, chevets, or apsidal east ends with a corona of chapels, elaborate and logical vaulting system, and, in the later Gothic styles, by extremely profuse adornment. The portals of French churches are generally lofty and imposing and richly sculptured. English cathedrals are much longer and lower than French ones. Their east ends are usually square and their portals small, and, in some examples, as at Wells, even insignificant.

Early Roman and Italian Edifices.— The earliest churches that we know were of the time of Constantine. They were of the form known as the *basilica,* consisting of three aisles (or, rarely, five) separated by columns. The middle aisle, which is the nave, was higher and broader than the others and always ended in a round apse, which bowed outward from the wall at the rear of the church. This type was much used in Italy. The church of Saint John Lateran in Rome is also called the "Ba-

silica of the Saviour.» Over its chief portal is the inscription «*Omnium urbis et orbis ecclesiarum mater et caput* (mother and head of all the churches of Rome and the world). Saint John Lateran is the cathedral of the diocese of Rome. The Pope as Bishop of Rome performed episcopal functions there until 1870, since when a deputy has officiated in his stead. Valentini calls it «this venerable temple, the first that was raised to the true God of the Christians.» It was built in the 4th century, but the interior has been entirely remodeled, and unfortunately by Borromini (q.v.). The façade is still later, for it was designed by Galilei in 1734; but this, with the effective deep shadows produced by the double porch gallery, deserves praise.

The great church of Saint Peter's at Rome is surpassed by no cathedral in splendor of design and equaled by none in magnitude. It marks the culmination of Renaissance church architecture. Its interior is 619 feet in length and 449 in width (along the transepts). The diameter of the cupola is 141 feet; the height from the ground to the top of the cross measures 470 feet. Saint Peter's is the largest church in the world. About the middle of the 15th century plans were discussed for a new building to replace the ancient structure that occupied the same site. The foundation stone was laid 18 April 1506, for a building according to the designs by Bramante, an Umbrian, who, through his plans for the basilica of Saint Peter and the Vatican palace, became the most famous of Italian architects. Bramante's influence was greater than that of any of his predecessors. Subsequently assigned to the work were Raphael, Michelangelo, Barozzi, Giacomo della Porta, Maderna and Bernini — the last mentioned designed the colonnades. The completed church was consecrated by Urban VIII on 18 Nov. 1626. Thus 120 years passed between the first planning and the dedication of the building, that period covering the reign of 20 popes; and, besides the seven architects mentioned, eight others succeeded one another in the construction of the edifice. The effect of the church itself, marred by Maderna's façade in the first part of the 17th century, is wonderfully enhanced by Bernini's colonnade, added about the middle of the same century. The dome is its most striking feature.

Conspicuous examples of Italian Romanesque are the cathedral of Pisa, A.D. 1067–1118, with the Leaning Tower and the Baptistry; S. Miniato at Florence; Genoa, 989–1199 and 1260; Pistoja, 1166– enlarged in the 13th century; and Monreale in Sicily. The Italian Gothic is exemplified very nobly by Milan Cathedral, 1385–1418, and the cathedral of Florence, 1294–1462 (though here we must note that the octagonal dome, 138½ feet in diameter, was added by Brunelleschi and belongs to the Renaissance period). Other fine Gothic Italian cathedrals are Siena, 1243; Arazzo, 1278; Orvieto, 1290; Lucca, 1350; and Bologna, 1390. Saint Mark's, Venice, 1063–1350, that wonder of Byzantine architecture is in the form of a Greek cross, of equal arms. The delicate sculpture in every part and «inexpressible color» Ruskin regarded as the characteristics upon which, as he expressed it, «the effects of Saint Mark's depend.»

French Cathedrals and Churches.— The two most famous French cathedral churches are here briefly described.

Pope Alexander III, being at the time a refugee in France, laid the first stone of Notre Dame, Paris, in 1163. The northern transept and portal were built in 1312 by Philip le Bel. Porte Rouge, on the north side, was erected in 1407 by the Duke of Burgundy, assassin of the Duke of Orleans, as expiation of his crime. But not until about 1714 was the choir completed as it now stands. The building is in the form of a Latin cross, with an octagonal east end. Two towers of equal height (204 feet) embellish the western façade. The spires have never been constructed. The length of the building is about 390 feet; its width at transepts 144 feet. It was the scene of the coronation of Napoleon on 2 Dec. 1804, and the wedding of the youthful Francis II and Mary, Queen of Scots. The capacity of the building is about 22,000 persons.

Reims (or Rheims) Cathedral was proclaimed long ago, by Charles VIII in 1484, «The Noble Church among all those of the kingdom.» The learned M. Demaison (see *Bibliography*) writes: «Among all our Gothic churches I should not dare to say that Reims ought to hold first place. It would be very puerile to desire to open thus a kind of argument and try to answer a question in respect to which every one has his preferences and personal tastes. But it is none the less true that in certain details the superiority of the cathedral at Reims can be asserted in a manner almost beyond dispute. Its lateral façades especially are of incomparable beauty.» With infinite regret we must change the tenses of this distinguished writer's verbs from present to past. The barbarous invaders in the European War have utterly demolished the noble fane. The building had the form of the Latin cross and was 453 feet long. It contained a collection of 5,000 statues. In it the French kings were crowned down to the time of Charles X. First of that brilliant succession, Philip Augustus, in 1179, was crowned in the old cathedral which was destroyed by fire, 6 May 1210. On 6 May 1211, the first stone was laid for the new edifice. For two centuries and more the builders toiled to produce a great church which should express the beliefs of their day in nobly aspiring lines and sculptural adornment of rare charm. And after the fire of 24 July 1481, the work of reconstruction and the works for the completion of the edifice went forward. The façade with its twin towers (263 feet), its rose-window, 120 feet in circumference, and the doorways with 530 statues, was of majestic beauty.

The principal Gothic cathedrals of France, besides Notre Dame of Paris and Notre Dame of Reims, are Leon, A.D. 1113–1200; Chartres, 1194–1260; Amiens, 1220–28; Rouen, 1202–20; Coutances, 1254–74; Beauvais, with the most lofty choir in Europe, rebuilt 1337–47; Bourges, 1190; Bayeux, with its 22 chapels. In addition there are (or were until the coming of the Germans), Chalons-sur-Marne, 1248; Soissons, 1175–1212 (demolished by the Germans); Meaux, 1170; Orléans, 13th century, reconstructed by Henry IV; Rennes, 1180–1389; Saint Brienne, finished 1248;

Tours, 1170–1550; Angers, 12th century; Laval, 12th to 16th century; Le Mans, 11th to 13th century; Nantes, 1434–1840; Clémont-Perraud, 1248; Le Puy, 12th century; Verdun, 13th, 14th and 15th centuries; Saint Dié, 13th, 14th and 18th centuries; Belley, 1413; Saint Fleur, 1396–1466; Limoges, 1273–1510; Tulle, 12th century; Sens, 1124–68; Moulins, 1465–1885; Nevers, 11th century (Romanesque); Troyes, 1208–1640; Lyons, 1107–1480; Autun, 1060–1178; Dijon, 1280; Grenoble, 11th, 12th, 16th centuries (Gothic and Romanesque); Saint Claude, 1340–1726; and Besançon, 11th and 15th centuries. Southern France boasts of Bordeaux, 13th and 14th centuries (Gothic); Agen, 12th and 16th centuries; Luçon, 13th and 17th centuries (various styles); Angoulême, 12th century (Romano-Byzantine); Périgueux, 1047 (Byzantine and Aquitaine); Poitiers, 1162–1379; Auch, 15th and 17th centuries; Bayonne, 1213; Tarbes, 12th and 14th centuries; Toulouse, 15th and 16th centuries; Carcassonne, 13th century; Albi, 1272–1512, one of the most original buildings in Europe; Cahors, Romano-Byzantine; Perpignan, begun in 1324; Rodez, 1277 and 15th century; Avignon, 11th century; Nimes, 11th century; Valence, 1095; Viviers, 14th and 15th centuries; Aix, 13th and 15th centuries; Fréjus, 11th-13th century; and the modern La Major, Marseilles, 1852–93.

Of French Romanesque, the most famous examples are the Abbaye-aux-Hommes (S. Etienne); Caen, commenced in 1066 by William the Conqueror, to expiate his fault in marrying his closely related Matilda; also, in the same place, the Abbaye-aux-Dames (La Trinité). The Classic movement in Paris produced the Madeleine (1764–1806), which combines Hellenic and Roman elements. It is an excellent reproduction of a Corinthian temple.

English, Scotch and Irish Cathedrals.—Of English church buildings the most interesting is Westminster Abbey, begun in 1050 by Edward the Confessor, who died soon after the choir was finished in 1065 and was buried there. Mr. Allen (see *Bibliography*) writes that "Edward the Confessor was interred before the high altar eight days after the dedication." To be crowned beside that tomb lent additional sanctity to the rite of coronation; and every British sovereign, from William the Conqueror to George V has received the crown before its altar. Henry III, who rebuilt the church, palace and monastery at Westminster, "chose his own burial-place on the north side of the stately shrine to which he had 'translated' the body of the Confessor. There, in due time, lay his son Edward I and his Queen; there king after king was buried"; there Chaucer was laid to rest, and there, nearly two centuries later, the poet's poet, Spenser,—and afterward the other poets of the famous "corner." Nelson's cry: "Westminster or victory"! epigrammatized the feeling and settled conviction of Englishmen that to be laid to sleep "in ground sacred with the dust of kings, warriors, churchmen, statesmen and poets, was an honor of the highest order." For three centuries Parliament met in Westminster's Chapter House, the cradle of Parliamentary government of the British empire. Edward III spoke of the Abbey as not only "the monastery church of Westminster," but also as the "special chapel of our principal palace." Twice in its long history a bishop's throne has adorned its choir stalls; but to-day it is not a cathedral it is — Westminster Abbey. The nave is the loftiest in England and the transepts contain some of the most beautiful work that can be found anywhere. The south transept is the "Poets' Corner," a name given by Goldsmith. Chaucer's tomb is here. Henry VII's chapel is the most perfect example of Perpendicular in existence. The vault is beautiful with "fan-tracery." Above the superbly carved stalls of the Knights of the Bath hang ancient banners. In this impressive and elaborate chapel the tombs of Queen Elizabeth and her victim, Mary, Queen of Scots, are side by side!

The famous "Jerusalem Chamber" (see Shakespeare's 'Henry IV,' Part II, Act V, Sc. IV) is on the right of the chief, or west, entrance. In this room the Assembly of Divines met in 1643, to frame the Westminster Catechism.

Saint Paul's Cathedral, in London, replaces the first Saint Paul's which was destroyed in the great fire of 1666. The first stone of the present edifice was laid 21 June 1675 by Christopher Wren, who drew up a comprehensive scheme for the new streets and squares of London, but was permitted to exercise his great talent only upon this main building in his general plans. Sir Christopher's son laid the last stone, the highest slab on the top of the Lantern, 363 feet above the pavement, in 1710. The entire building was finished in 35 years under one architect, one master mason, and while one bishop, Dr. Henry Compton, occupied the see. Compare what is said above about Saint Peter's. The plan of the building is the Latin cross surmounted by a dome 145 feet in diameter, and the latter combines characteristics of both Bramante's and Michelangelo's designs for the dome of Saint Peter's in Rome. The dome is the great feature of Saint Paul's and almost seems to typify London. The length of the building, east to west, is 500 feet; its width is 125 feet, except at the west end where two towers extend the width to 180 feet. The choir stalls, carved by Grinling Gibbons, are superb.

Saint Paul's is second only to Westminster Abbey in its number of monuments to the celebrated dead. Here lie Wellington, Nelson, Rodney, Gordon, Lord Cornwallis, Sir Joshua Reynolds, Landseer, Turner and the American painter, Benjamin West. Westminster Abbey is the church of the king: Saint Paul's is the church of the citizen. It has always been chosen as the scene for stirring commemorations and thanksgivings ever since Queen Anne celebrated Marlborough's victories there. The streets around Saint Paul's bear such names as Amen Corner, Creed Lane, Canon Alley and Paternoster Row.

Canterbury Cathedral, founded soon after the Norman conquest, is 545 feet long and the greater transept is 170 feet. It has three towers, the central one being 230 feet high. The crypt, which extends under the entire structure, is the finest in England. In 1561 Elizabeth gave it to the Flemish and French refugees fleeing from the bloody wars of the Spanish Alva. The choir is the earliest example of the importation of the pure Ile-de-France style of transitional Gothic. After a fire which de-

stroyed the original choir (that of the Norman Church) the work of reconstruction was entrusted, in 1174, to the French architect, William of Sens, who naturally supplied a purely French contemporaneous design. As Canterbury was four centuries in building it contains specimens of all classes of Pointed Architecture. The tomb of Stephen Langton, first subscribing witness of the Magna Charta, is here. The shrine of Thomas à Becket, who was murdered here in 1170, became a pilgrimage place of great celebrity and veneration.

Salisbury Cathedral, begun in 1220 and finished in 1258, is universally selected as the best embodiment of Early English design; and this for the good and sufficient reason that it has the excellent quality of unity, which bears the same relation to architecture that composition does to painting. The plan is a double cross; extreme length, 474 feet, and width along greater transept, 230 feet. The great east window is the finest specimen of its kind in England.

In Lincoln Cathedral was developed the first complete form of the Pointed Arch. Lincoln greatly resembles the Cathedral of Dijon, but is earlier. It was begun by Hugh of Burgundy in 1185, after an earthquake had destroyed the earlier building. The Lincoln east front is regarded as almost perfect in design. The main stylistic divisions at Lincoln are given as: First, Saint Hugh's choir and east transept, 1191–1205; second, nave and west front, 1205–50; third, presbytery or Angel choir, 1256–80; fourth, upper portions of towers, 14th century. Lincoln Cathedral has a length of 524 feet externally, and measurement inside gives 482 feet. Its central tower is 300 feet high.

Peterborough Cathedral has been called a monument of the latest English Romanesque style. The first part of this building to be erected was the apse, about 1120. A critic says: "nothing of the Romanesque architecture in England is quite so fine" as that rounded apse, the east end of Peterborough. According to the same observer, "the interior of the church is even more impressive, relatively speaking, than the outside, and is probably the finest early interior in England."

There is much Early English work and some Perpendicular in this cathedral. The west front with its three enormous doors is famous.

Ely is one of the long and comparatively narrow English cathedrals, whose main structures, the nave and transepts, are Norman. Its length is 516 feet and its width 190 feet. The great west door is both Early English and Decorated and the Galilee Porch is one of the finest examples of Early English in existence. The Octagon, the work of Walsingham (13th century), is the gem of Ely. The choir-stalls are the finest Decorated stalls known.

The cathedral at York is 524 feet long, 250 feet wide and has a superb central tower. The nave is 93 feet high. This "King of Cathedrals" is always called York Minster. Generally speaking it is of the Perpendicular style. The west front is Early Decorated, Late Decorated and Perpendicular. The towers rise to 200 feet. The south transept (1216–41) and the north transept (1241–60) are Early English. For stateliness and magnificence the choir is unrivaled. The glass is magnificent and there is more ancient glass here than in any other building in the world.

Winchester, the largest cathedral in England, represents every style from pure Norman to early Renaissance. It has the most beautiful nave in England. The choir-stalls are magnificent. Alfred the Great was crowned here. It is pre-eminently a cathedral of royal associations.

Exeter is the best specimen of the Decorated style. The finest work of the 14th century is here. Its special features are the screen on the west front, lady chapel, bishop's throne, east window and minstrels' gallery with wonderful carvings.

Lichfield, Early English and Decorated, of the 13th and 14th centuries, is famed for its three lovely and delicate towers, west front and lady chapel.

Chichester, though small, is a treasure-house; for it contains every style without a break from the 11th to the 16th century. It is called "an epitome of English architecture."

Gloucester is noted for the most beautiful choir in England with the magnificent east window, 72 feet high and 38 feet wide, the largest window in Europe. The central tower, cloisters and lady chapel are also famous. Gloucester offers splendid examples of the transition from the Decorated to the Perpendicular.

Wells is celebrated for the carvings of its capitals, its chain-gate, chapter-house, inverted arches in the nave, east end and singular west front. It was built in 1206–42.

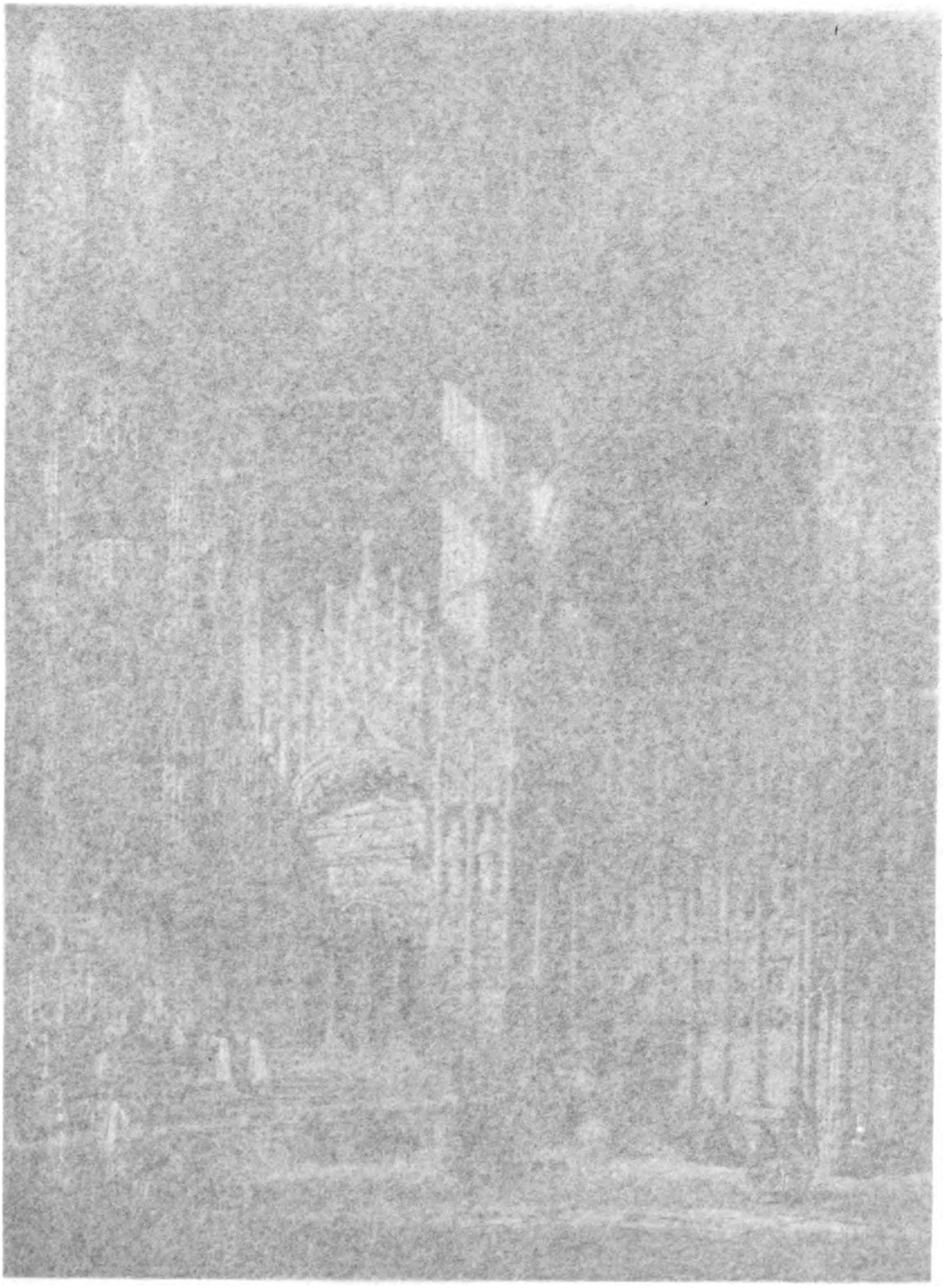
Rochester has the finest of all Norman doorways in its west front. This cathedral was built in the 12th century.

Durham is the most picturesquely situated of all English cathedrals. Its Galilee chapel, choir of nine altars, Neville screen and Joseph's window (a splendid example of Early Decorated tracery) are its features. Early Norman, Early English and Early Decorated are found here. The tomb of the "Venerable Bede" is here.

In Scotland there are, besides modern edifices, only two complete and entire cathedrals,—those of Glasgow and Kirkwall. Consult Addis, M. E. L., 'The Cathedrals and Abbeys of Presbyterian Scotland,' Philadelphia 1901.

In Dublin there are two cathedrals: Christ Church, built in 1038, restored and, in 1878, reopened; Saint Patrick's, erected 1190 and restored between 1860 and 1865.

German Cathedrals and Churches.—Turning now to German cathedrals, we may mention as typical structures the enormous structure at Cologne and the new cathedral at Berlin. The former was begun in the middle of the 13th century and only in part finished by 1509, after which date work was discontinued, and not resumed until 1830. In 1863 it was thrown open to the public, and in 1880 it was finished. It is 511 feet long and 231 feet wide. The towers reach the height of 513 feet above the ground. The nave, although five feet narrower, is 11 feet higher than that of the cathedral at Amiens. Consult Fergusson, J., 'A History of Architecture in All Countries' (London 1874, Vol. I, p. 533 and Vol. II, p. 67); also Moore, C. H., 'Development and Character of Gothic Architecture' (2d ed.,



INTERIOR OF CATHEDRAL AT TOLEDO, SPAIN

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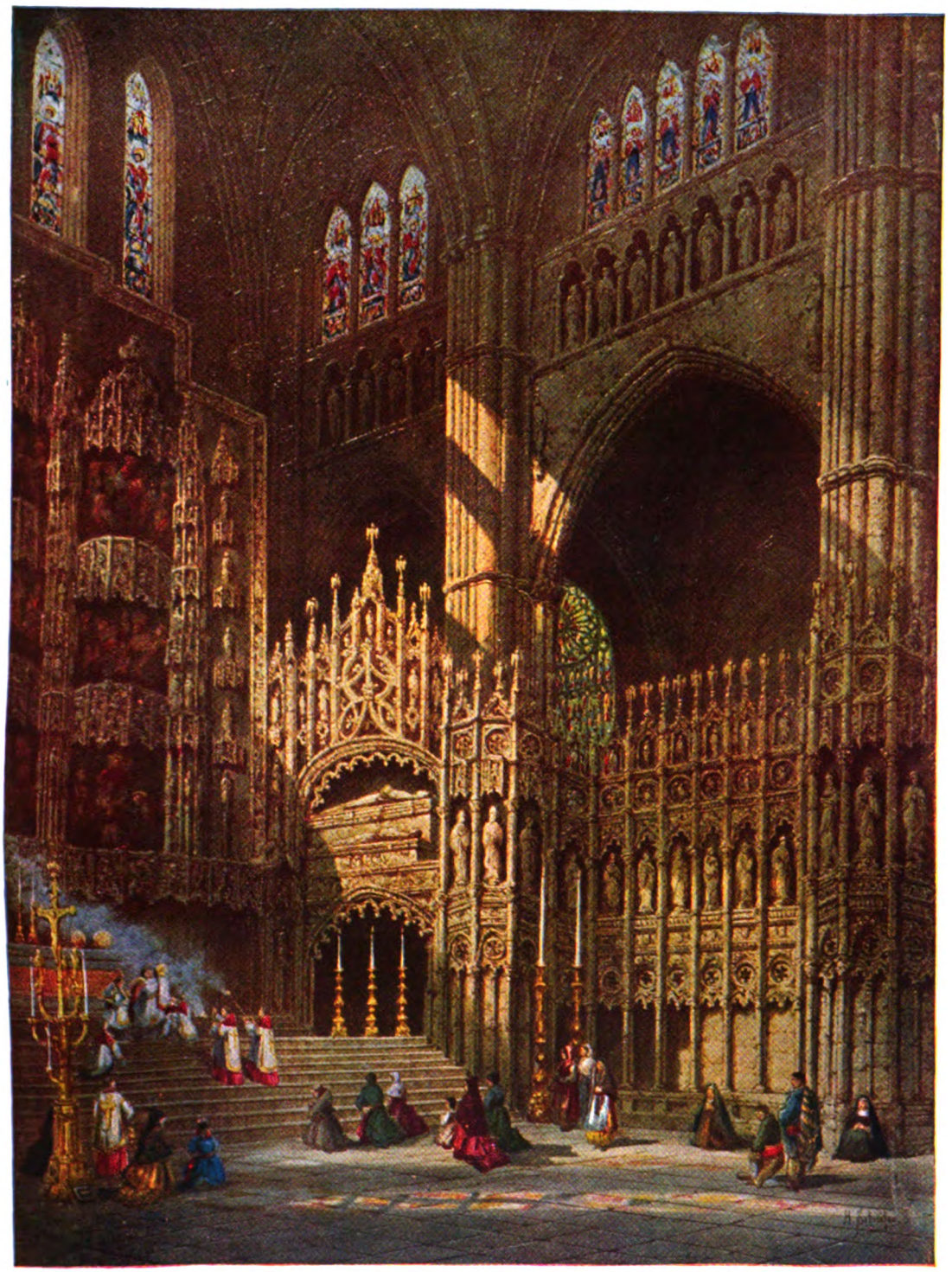

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INTERIOR OF CATHEDRAL AT TOLEDO, SPAIN

New York 1906, p. 253). The new cathedral at Berlin, dedicated in 1905, has its principal entrance for the people of that city and for the general public at the side; the traditional west-façade door or doors are reserved for "exits and entrances" of the Imperial family, and for entrances not followed by exits — since this cathedral is intended to serve as an Imperial mausoleum. The architect, apparently striving after Italian Renaissance effects, has produced a mere "school classic," architecturally commonplace in execution though unusual in plan. Examples of German Romanesque are the cathedrals at Mayence (1036), Worms (1110–1200), Trèves (1047), and Speyer (11th century) — these four being regarded as representative cathedrals of that period. France and Germany claim the Cathedral of Aix-la-Chapelle, built by Charlemagne as a royal tomb for himself. It "is interesting as resembling Saint Vitale at Ravenna," says Prof. Banister Fletcher in 'A History of Architecture on the Comparative Method' (London 1901). "In plan it is a polygon of 16 sides, 105 feet in diameter. Internally, every two angles converge on to one pier, which thus number eight. These support a dome 47 feet 6 inches in diameter. It is of historic interest as the crowning place of the Western Emperors. Lübeck Cathedral is a type of brick architecture peculiar to North Germany; the nave and transept are of this period, being founded in 1173." Examples of Gothic in Germany (besides Cologne Cathedral) are Strassburg Cathedral, 1240–1365, which has two western towers, though only one spire (which dates from 1429) of open work tracery; Ratisbon Cathedral, 1275–1534, the open spires of which were added in 1859–69; Ulm Cathedral, spacious and lofty, with fine choir stalls; Magdeburg, 1208–11; Halberstadt, 1250; Altenburg, 1255; Freiburg, 1270; Meissen, 1274; Osnabrück, 1318; Augsburg, 1321–1431; and Metz, 1330. Saint Elizabeth, Marburg, 1235–83, has the side aisles raised to the same height as the central aisle, a new type which Germans call the "Hall Church"—as is also Munich Cathedral; Saint Stephen, Vienna, 1300–1510, a splendidly impressive church in the heart of the city with traceried vaults, a spire and the original stained glass. The cathedral of Prague (1344–52) shows French influence.

Russian Ecclesiastical Edifices. — In Russia, the largest and most famous of Petrograd's churches is the cathedral of Saint Isaac of Dalmatia, which was erected 1819–58) in place of an earlier church, after plans by R. de Monferrand, and at an expense of about $12,000,000. Its plan is a cross 364 feet long, and the extreme width is 315 feet. It is built of granite and marble. The central dome, which is gilded and is 87 feet in diameter, is crowned by a lantern more than 40 feet high. Above the floor the dome rises to the measured height of 269 feet (interior), and 333½ feet (exterior) to the top of the cross on the lantern. The walls of the interior are lined with marble of many different kinds, and each of the chief entrances is ornamented with 16 monolith columns, 7 feet thick and 54 feet high, of red granite from Finland. In the same city, the cathedral of Saints Peter and Paul is the mausoleum of the Russian Imperial family. It is a domed structure 210 feet in length and 98 feet wide. In Moscow, and near the centre of the Kremlin, which is in the very heart of the city, stands the cathedral of the Assumption, the church in which the Tsars are crowned, built by Fioraventi of Bologna in 1475–79. Its form is rectangular and its dimensions moderate (length 125 feet and width 82 feet). Its central dome rises to a height of 138 feet, and there is a smaller dome at each of the corners. Archangel Cathedral in Moscow was, before the time of Peter the Great, the mausoleum of the Tsars; and near it is the building in which rulers of the same family are christened and married, the cathedral of the Annunciation. The Inner City contains one of the most revered sanctuaries in Russia, that of the chapel of the Iberian Virgin. Saint Basil's, with its variety of domes and strange colors, is one of the most famous churches in Russia. The cathedrals at Moscow, Kiev, Novgorod, and elsewhere, have an eastern aspect, because of their bulbous-shaped domes and barbaric details. Prof. Banister Fletcher writes: "In Greece and Russia the Byzantine style has been the accepted treatment of the Greek Church up to the present day. In Greece the buildings are small, but often exquisitely executed, as the church of Daphni, near Athens; the well-known cathedral at Athens," etc. Saint Sophia at Constantinople, built by order of Justinian A.D. 532–37, is a masterpiece of Byzantine architecture; the minarets were added many years later.

Spanish and Portuguese Cathedrals.— Spanish Gothic cathedrals of special interest or beauty are Burgos Cathedral, dating from 1230; Toledo, 1227; Tarragona, 1235; Barcelona, 1298; and Seville, 1403–1520, the last-mentioned being the largest mediæval cathedral in any country. Its tower, called the Giralda (upper part rebuilt in 1395; the lower built in 1195) is not Gothic but Spanish Saracenic. Others are Zamora, 1151; Leon, 1250; Valencia, 1262; Oviedo, 1388; Pamplona, 1397; Gerona, 1312; Salamanca, 1510–60; Segovia, 1525, and Valladolid, 1585. Also Spanish Saracenic is the great Mosque at Cordova (A.D. 786), some portions of which were destroyed by Charles V to build his church, described by Russell Sturgis as an "interpolated Christian cathedral church in the very heart of the great prayer-hall of the mosque." In Portugal the cathedral at Coimbra is a fine example.

Flemish, Dutch, Scandinavian and Swiss. — In the Netherlands, the famous ecclesiastical buildings are the cathedral of Sainte Gudule of Brussels; Saint Martin at Ypres, begun in 1254; the cathedral of Antwerp with six aisles; the cathedral of Liége; Saint Sanveur, Bruges, 13th and 14th centuries; Saint Bavon, Ghent, made a cathedral in 1559; Tournai (11th and 12th centuries); Saint Rombaut, Malines (Mechlin), with its huge spire; the cathedral of Bois-le-Duc (1419) in Holland, and that of Utrecht (1251). Norway, Sweden, Denmark and Switzerland have borrowed architectural forms or received guidance for the construction of their most important buildings from other countries. Thus, the Cathedral of Upsala was built from the designs of Etienne de Bonneval of Paris. Switzerland has Lausanne and Bern (1421).

American Ecclesiastical Architecture.—

In the United States some churches show independent architecture while others are influenced by foreign styles.

The cornerstone of Saint Patrick's Cathedral, New York, was laid 15 Aug. 1858, exactly six centuries to the year, after the completion of Salisbury Cathedral, England, and about six centuries after the laying of the cornerstone of Saint Patrick's Cathedral in Dublin. The original plans of its architect, Mr. James Renwick, were drawn in 1853. The ground on which it stands (Fifth and Madison avenues, 50th and 51st streets) was bought in 1852 by the trustees of the cathedral for $59,500. The building admirably and quite frankly perpetuates the decorated and geometric style of Gothic architecture which prevailed in Europe from 1275 to 1400, examples of which are the cathedrals of Rheims and Amiens and the naves of York Minister, Exeter and Westminster. Its plan is a Latin cross. The exterior dimensions are: Extreme length (with lady chapel), 398 feet; extreme breadth, 174 feet; towers at base, 32 feet; height of towers, 330 feet. The interior dimensions are: length, 370 feet; breadth of nave and choir, including chapels, 120 feet; length of transept, 140 feet; central aisle, 48 feet wide and 112 feet high; side aisles, 24 feet wide and 54 feet high; chapels, 18 feet wide, 14 feet high and 12 feet deep. Above the granite base-course, the exterior is entirely of white marble. The lady chapel, which was finished in 1906, is of 13th century French Gothic design, by Mr. Charles T. Mathews. Its length is 56½ feet, its width 28 feet and its height 56 feet. The cost of the building was about $4,000,000. The ceremony of dedication took place 25 May 1879, somewhat less than 21 years after the laying of the cornerstone. Between the lady chapel and Madison avenue stand the archbishop's house and the presbytery.

The cathedral church of Saint John the Divine, situated on Morningside Heights, in New York city, was begun in 1892. It has been under active construction since 1901. The design of Heins and LaFarge was adopted in 1891, and the consecration of the choir occurred 19 April 1911. The material of the walls is Mohegan granite; wrought work of exterior, Frontenac stone and Mohegan granite; wrought work of interior, Frontenac stone; columns of apse, Penobscot granite; marbles in choir and chapels, Siena, Cipollino, serpentine, Alps green, Belgian black, yellow Numidian, red Numidian, Hauteville, Skyros, Briche violaces and Grueby tile. The rose red bases of walls and piers are of South Dakota jasper. The total projected length of the building is given as 520 feet; the total projected breadth, across transepts, 290 feet; total projected height, to crown of dome, 254 feet; total projected height, to top of spire, 425 feet. Both *The American Architect* (Vol. XCIX, p. 146) and Mr. LaFarge (in *Scribner's*) lay special stress on the octagon of Ely Cathedral when tracing to its source the idea carried out in Saint John's "of the arrangement proper to the modern and Protestant Cathedral in which the preaching is as important as the procession. Stated in simplest terms, this is to be essentially a modern cathedral; not a mere copy of any ancient one or a reproduction of an ancient type; and it borrows suggestions not alone from Ely but also from Spanish churches, perhaps particularly that of Toro." The *Architectural Record* reminds us that "the winning design was described, at the time of the competition of 1891, as a domical church in a Gothic shell." Up to 1916 somewhat less than $4,000,000 had been spent for the choir, with its ambulatory and chapels, the arches of the crossing and the crypt.

Saint Thomas's Church, New York, was founded in 1823. In 1867 the present site was acquired (Fifth avenue at 53d street); three years later the "old" Saint Thomas's was dedicated, and for a third of a century its tower was a noted landmark on the avenue; moreover the church was beloved on account of its magnificent altar, with LaFarge's decorations, and for its organ. That earlier building was destroyed by fire 8 Aug. 1905; a competition for architects' designs was held; the design by Messrs. Cram, Goodhue & Ferguson was selected. Adequate size was achieved (the nave is 43 feet wide and the vault rises 90 feet above the pavement), despite the limited area available, by the successful solution of novel problems in ecclesiastical architecture. The building-stone employed for the exterior is the oolithic limestone of Bowling Green, Ky.; for the interior, soft yellow sandstone from South Carrollton in the same State. Guastavino tile was used for the vault. The cost of the new Saint Thomas's was approximately $1,000,000. The interior is simple, though restful rather than severe, as to its main lines and proportions.

Other beautiful, or historically interesting churches in New York are Trinity; Grace; and Saint Paul's Chapel (Colonial period and single example of original church architecture of that period remaining in the city), etc. Among the American cathedrals and churches outside of New York city are the Roman Catholic Cathedral at Baltimore, which dates from 1800; that of Saint Peter and Saint Paul at Philadelphia, a domical Renaissance structure (height of dome, 210 feet); the Immaculate Conception Cathedral at Denver; Saint Joseph's Church, and the Cathedrals at Hartford, Saint Louis, Providence, Boston, Albany, Buffalo and Rochester.

Montreal, Canada, is fortunate in the possession of the Catholic Cathedral of Saint James on Dominion Square; the large church of Notre Dame, built 1824; and the Anglican Christ Church Cathedral (Early English architecture).

Finally, looking southward to Mexico and other New World countries, attention should be called to the powerfully designed and executed cathedral at Puebla before mentioning the enormous jumbled mass of the cathedral in the City of Mexico, which has Italian Renaissance and Oriental domes and Churrigueresque façades. In Peru the most noteworthy ecclesiastical buildings are the cathedral and the church of the Compañia in Cuzco and the cathedrals in Arequipa and Lima. The Brazilian capital possesses, in its not quite appreciated cathedral, a building of rather impressive dignity. The wide façade of the shallow cathedral at Buenos Aires does not harmonize with the genius of a country that sends the roots of its power every year deeper into the soil.

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ESTHER SINGLETON,
Author of 'Famous Cathedrals.'

CATHELINEAU, kä'tē-lē'nō, **Jacques,** French Vendean general: b. Pin-en-Mauge, Anjou, 5 Jan. 1759; d. 11 July 1793. On the breaking out of the French Revolution he was living quietly with his family, when an unforeseen event suddenly called him forth from obscurity. In March 1793, during the levy of the conscription which the National Assembly had decreed, the youth of the district of Saint Florent rose in insurrection, and put the officials and *gens d'armes* to flight. They then returned home, and were awaiting the terrible revenge of the Republicans, when news of the outbreak reached Cathelineau. He instantly determined to put himself at the head of his countrymen. Causing the alarm-bell to be rung in different places, he was soon followed by almost all the men capable of bearing arms, surprised several Republican posts, carried off their cannon and now mustered several thousand strong. As he did not deem himself equal to the post of commander, he placed himself under Bonchamp, and Elbée, but after the victory of Saumur, 9 June 1793, was formally invested as commander-in-chief. On this he resolved to make a decisive attack on Nantes, and appeared before it with 80,000 men, still further increased by 30,000, whom Charette brought from lower Poitou. Notwithstanding these vast numbers, and the greatest display of undisciplined gallantry, the attack was repulsed, and Cathelineau died shortly after of the severe wounds which he had received. For his piety he was called the "Saint of Anjou." Consult La Porte, 'La légende de Cathelineau' (Paris 1893); Muret, 'Vie populaire de Cathelineau' (Paris 1845).

CATHERINE. See CATHARINE.

CATHERINE'S SAINT, or SANTA CATHARINA, an island close to the coast of Brazil, between lat. 27° and 28° S., and belonging to the province or state of Santa Catharina (q.v.). It is 30 miles long and 10 broad, and contains Desterro, the state capital. The surface is mountainous.

CATHETER, any tubular organ used to insert into a mucous canal or hollow organ. Thus, there are nasal catheters for the nose, eustachian catheters for the internal ear, urinary catheters for the bladder. This latter is the more frequently used. Materials used in making urinary catheters are silver, glass, rubber, woven linen and gum elastic. A stylet is generally used for putting the less flexible catheters in place. Catheters used for male patients are about 10 inches with a curve of two inches at the extremity in metal instruments. For females, five inches is the proper length, the metal instruments curving a half-inch. Great care should be exercised in its use, that it be kept clean, to avoid cystitis (q.v.).

CATHETOMETER, in physics, an instrument for the exact measurement of small vertical distances. In its usual form it consists of a horizontal telescope, mounted so as to slide upon a fixed, graduated, upright support or post. The telescope is raised or lowered until its cross-hairs coincide with one of the objects whose difference in height is to be determined, and the position of the telescope upon the vertical, graduated post is noted by means of a vernier or micrometer. The telescope is then brought to the elevation of the second object in the same way, and the difference in the two readings gives the desired difference in height. A cathetometer that is well designed and constructed is an instrument capable of giving very precise results when in the hands of a skilful observer. It is greatly used in accurate barometry, for determining the height of the barometric column above the mercury in the cistern.

CATHODE, the negative pole of any given portion of an electric circuit, such as a battery, an electrolytic cell, vacuum tube, a motor, etc.

CATHODE RAYS. See ETHER; ELECTRON; MOLECULAR THEORY; RADIATION, etc.

CATHOLIC APOSTOLIC CHURCH. A body of Christians founded by Rev. Edward Irving, in London, England, in 1835, hence often called "Irvingites." Irving was pastor of a Scotch Presbyterian Church, but, changing his views, was dismissed. He held that the gifts bestowed upon the Apostolic Church — words of wisdom and prophecy, powers of healing and miracles, discerning of spirits and speaking in divers tongues and interpretation thereof — were not meant exclusively for the apostles and their immediate successors, but are given to all who have the living faith. He died soon after he ceased to be pastor of the Presbyterian Church, but his followers developed his ideas and completed the organization of the Catholic Apostolic Church, which has four classes of ministers: Apostles (the chief of all), prophets, evangelists and pastors, each comprising 12 members, when complete these 48 presiding over the 12 tribes of the general church. Each congregation has its "Angel," or bishop, with 24 priests, six of each class of the ministry; there are also elders and deacons for temporal affairs, and a corps of sub-deacons, acolytes, singers and doorkeepers. The service is highly ritualistic, with "High" and "Low" celebrations, vestments, candles, incense, holy oils, etc. The Church accepts the Apostles', Nicene and Athanasian creeds, and expects soon the second coming of the Lord. The denomination was established in the United States before 1851.

The New Apostolic Church arose in Europe as the result of a difference of view as to the number of apostles who might be appointed. The original body limits it to 12; the new branch holds that a larger number may be

created. The latter has in the United States 13 churches, 19 ministers and 2,020 members; the former, 11 churches, 14 ministers and 2,907 members. These figures are those of the census of 1906. Consult Life of Edward Irving (of which there are several) and E. Miller's 'History and Doctrines of Irvingism' (London, Eng., 1878).

CATHOLIC BENEVOLENT LEGION, a fraternal society for Roman Catholic laymen, designed to afford to the members facilities for intellectual improvement, social advancement and such other advantages as are offered by similar non-Catholic fraternities. It was organized in 1881 and incorporated under the laws of the State of New York with 11 charter members. Thirty years later the Society had 17,000 active members, and had paid to widows and orphans of 8,000 deceased members the sum of $21,000,000. The organization is incorporated under the style of the Supreme Council, Catholic Benevolent Legion, and to the Supreme Council final appeal is made on all matters of importance emanating from State or subordinate councils. Male Roman Catholics who are personally acceptable, of sound bodily health, and between the ages of 18 and 55, are alone eligible to membership. There is a relief fund on behalf of sick and distressed members, and a benefit fund, out of which a sum not exceeding $5,000 is paid to the beneficiaries of deceased members, and a sum not exceeding $2,500 to a member who is permanently disabled. A subordinate council of the Catholic Benevolent Legion may be formed in any congregation or parish; a charter is granted by the Supreme Council to a group of 15 or even of 7 eligible persons who associate themselves with a view to enter the fraternity. The organization has the express approval of the Pontiff and of all the archbishops and bishops in whose jurisdictions councils of the fraternity have been formed.

CATHOLIC CHURCH, a phrase signifying universal Church, the whole body of true believers in Christ; but the term is commonly used as equivalent to the Roman or Western Church. Like most other words used in ecclesiology, the term Catholic was borrowed at first from the New Testament. It occurs in some editions of the Greek original — including that issued in connection with the last revision — in the titles prefixed to the Epistles of James, 1 and 2 Peter, 1 John and Jude, and is the word translated "general" in the King James Bible. The first to apply it to the Church was the Apostolic Father Ignatius. When he and his successors used it they meant to indicate that the Church of which they constituted a part comprised the main body of believers, and was designed, as it was entitled, to be universal. In this sense the Church was opposed to the sects and separate bodies of heretics who had separated themselves from it and were now outside its pale. When, in the 9th century, the separation between the Eastern and Western churches took place, the latter retained as one of its appellations the term "Catholic," the Eastern Church being contented with the word "Orthodox" still used by the Russian emperors in their politico-ecclesiastical manifestos. When the Protestant churches separated from their communion with Rome in the 16th century, those whom they had left naturally regarded them as outside the Catholic pale. They, on the other hand, declined to admit that this was the case, and the term "Catholic Church" is used in the English Liturgy apparently in the sense of all persons making a Christian profession.

CATHOLIC CHURCH, Roman. By this name is designated the large body of Christians, united in doctrine and worship under the supreme jurisdiction of the Pope, the bishop of Rome. (See PAPACY). The members of this communion are wont rather to speak of it as the "Catholic Church," but admit the term "Roman" in the sense that "to be Roman is to be Catholic and to be Catholic is to be Roman." They hold that their Church alone possesses in its fullness the system of truths, laws and practices for the worship of God which was instituted by Jesus Christ (q.v.). Hence a brief statement of Catholic teaching on the origin, nature and properties of the Church of Christ will enable us to understand why the Roman Catholic Church demands that all men submit to her authority as a teacher, divinely appointed to make known with absolute certainty the conditions of salvation.

From the Four Gospels, considered as trustworthy historical documents, we learn that Jesus Christ was certainly a divine messenger to all mankind, and that therefore all men are bound to receive His message with implicit submission. The doctrine which He teaches may be an enforcement of truths which man might have learned, however imperfectly, by the use of his natural powers, or may include new truths which his natural powers would never have discovered. As Christ did not remain on earth to teach all men in person, He chose a band of apostles, whom He commissioned to preach to all nations the truths He had taught them, promising His assistance unto the end of the world, and imposing upon all men, under penalty of losing their souls, the obligation of receiving His doctrine. The presence of the Holy Spirit was to preserve the Apostles from error and keep them perfectly united in their teaching.

Besides the gift of infallibility (q.v.), He conferred on them jurisdiction over all believers, the right to govern with threefold power, legislative, judicial and executive. Moreover, they were to sanctify men by certain religious rites, called sacraments (q.v.), and for this purpose received the gift of Holy Orders (q.v.). To Peter (see SAINT PETER), one of the Twelve Apostles, was granted a primacy, not merely of honor, but of jurisdiction. On him was Christ's Church to be built; he was to feed the entire flock, the lambs and the sheep. By thus organizing a body to teach, govern and sanctify men under the primacy of Saint Peter, Christ founded a religious society, supernatural in aims and means, and he chose for it the special name, the Church. (See CHURCH, AN ORGANIZATION OF CHRISTIANS). This society was to last even unto the day of judgment; its duty was to teach all men; wherefore the Apostles appointed their successors and transmitted to them the authority received from Christ. As the primacy of Saint Peter was the first foundation, necessary to ensure the unity and stability of the Church, it too was to

last forever. The power he received was for him and his successors. There never should come a time when the doctrine of Christ would be lost through corruption.

Whence we gather that there exists to-day a religious society, empowered to teach with certainty all the truths of Christianity, and that it is a visible body, united in its government and religious teachings. The members of this society submit to its infallible teaching by profession of the faith, to its sacred ministry by the reception of baptism (q.v.) and to its ecclesiastical rule by obedience. If all men are obliged to enter this society, it is evident that Christ provided some signs, notes or marks by which His Church can become known to all earnest inquirers, by which it can be distinguished from other associations. Christ intended that His Church should be known by Unity. It was to be one in faith, one in government, one in worship and one in the charity uniting all its members. It was to be known by Holiness. The Church is holy in its Founder; in its aim to lead men to God; in its means of sanctification, in the heroic virtue of many members and in the permanence of miracles among them. It was to be Catholic; that is, conspicuously diffused everywhere. Finally it was to be Apostolic. The governing and teaching body is the continuation of the Apostolic body to which Christ gave His mission and with which He promised to remain until the end of time. Whoever is not in communion with the successor of Saint Peter cannot possess union with the Apostolic body. The obligation of becoming a member of the Church is often expressed in these words: "Out of the Church there is no salvation." They do not mean that all who die out of the visible communion are lost. God does not inflict punishment but for a wilful fault, and those who without fault cannot see their obligation of joining the Church are not to blame. If, however, anyone, knowing this obligation, refuses to comply with it, he puts himself out of the way of salvation. The same holds true for those who neglect to examine properly into a matter of so great importance.

Catholics hold that the marks of the true Church of Christ are found only in the Church in which the bishop of Rome holds the primacy. The bishops of this Church all over the world are the successors of the apostles, possessing the right to teach, to rule, and to sanctify. The gift of infallibility, that is, the right to declare that certain doctrines have been revealed by God is not personal to each bishop, but belongs only to the whole body of bishops, whether gathered in general council or not. The consent of the universal Church according to Christ's promise is a sure criterion of revelation. To the bishop of Rome as the successor of Saint Peter belongs the primacy of jurisdiction over the whole Church, complete, supreme, ordinary, and immediate over each and all the churches of the world, over each and all the bishops and the faithful.

In this primacy is included the supreme authority as teacher of the Church, or the prerogative of papal infallibility. By virtue of a special supernatural assistance of the Holy Spirit promised to Saint Peter and his successors, the Pope cannot err when, as supreme teacher of the universal Church, he defines a doctrine concerning faith or morals to be held by the whole body of the faithful. Only when these four conditions are fulfilled is the Pope infallible: First, he must speak not in his private capacity, not merely in his official character, but as supreme teacher. Secondly, the matter defined must concern faith or morals. Thirdly, the judgment must be delivered with the manifest intention of commanding intellectual assent. Fourthly, the definition must be given to the whole body of the faithful. It is clear that infallibility has absolutely no connection with the Pope's personal qualities and is entirely distinct from impeccability, or incapability of sinning. The extent of papal infallibility is the same as that of the Church's infallibility. It embraces all the truths that God has revealed as the object of faith, and extends to other truths and matters of faith without assurance of which it would be impossible or very difficult to preserve the deposit of revealed truth.

It follows from what we have hitherto said that whoever wishes to know Christ's doctrine must appeal to the living authority. The Church as teacher, that is, the bishops now living in union with the Pope, can alone tell us what doctrines were revealed. This knowledge is not acquired from new revelations, but with the assistance of the Holy Ghost from various sources, chief among which is the preaching of the Gospel, by which the doctrines of Christ are handed down as a sacred heritage from age to age. Thus, even if nothing had ever been written, we should have to-day, incorrupt and infallible, the means of preserving religious truth which Christ established, namely Tradition. However, it was natural that those who were commissioned to teach should also set down their teaching in writing. Hence we possess many documents and monuments from which we learn what the Church taught in past ages and what it now teaches; the truths revealed remain unchanged. Moreover, we learn from the Church that God Himself provided, by means of men, certain writings, containing revealed truth, and gave them to the Church for the instruction and direction of the faithful. (See BIBLE). From it alone we learn what books have been so inspired and constitute Holy Scripture; the Church alone can authoritatively interpret these writings. Tradition, therefore, is prior to the Christian scriptures both in time and in thought. It is wider in its scope, for it embraces Scripture as an instrument by which tradition is handed down and on the other hand contains matters which are not in Scripture. First and principally, tradition teaches us the authoritative character of Scripture itself. Even were all the copies of Scripture destroyed, the living voice would still proclaim the entire Christian teaching. Catholics yield to none in their esteem of Holy Writ, as the inspired word of God, but they so esteem it because of what they learn concerning it from tradition. The chief sources from which this tradition is learned are the acts of councils, the writings of the Popes, of the Fathers of the Church, inscriptions, monuments, pictures, liturgies, rites and pious customs, in a word, every way in which the Church is wont to profess her faith.

The Chief Doctrines of the Catholic Faith.— Catholics believe in one, true, living

God, the Creator and Lord of heaven and earth and of all things visible and invisible, almighty, eternal, immense and incomprehensible; infinite in will and intellect, and in all perfection, who, being one, singular, absolutely simple and unchangeable spiritual substance is to be regarded as distinct really and in essence from the world, infinitely happy in and from Himself and unspeakably elevated above all things that exist or can be conceived. He knows all things in the most perfect manner, by one all-embracing act of His intellect, from eternity to eternity ever the same. He knows His own being, all things that are possible, past, present and future, and all things that are not and never have been nor will be, but which would be if some condition were fulfilled. He is all-wise, all-holy, all-just, true, faithful and bountiful. Moreover, in God as there is one divine nature, so there are three divine persons, Father, Son and Holy Ghost, really distinct from one another, perfectly equal to one another. Nevertheless there are not three Gods, but one God. The Father is unbegotten, the Son is begotten of the Father, and the Holy Ghost proceeds from the Father and the Son. (See TRINITY, DOCTRINE OF THE). This one true God of His goodness and by His omnipotent power, not in order to increase His happiness, not to acquire perfection, but to manifest it by the good which He imparts to His creatures, in accordance with His absolutely free decree, at once from the beginning of time framed out of nothing as to the whole of their substance, two kinds of creatures, spiritual and material, the angels and the world, and then man, in whom spirit and matter were united. God preserves and governs by His providence all things that He has created.

To the angels He gave sanctifying grace and with it the power to merit eternal happiness by free service. Many of them rebelled and were cast into everlasting fire, the rest were confirmed in grace and admitted to the beatific vision of God. God "formed the body of the first man out of the slime of the earth." He created his soul immediately, as He creates the soul of every man; the soul is a spirit, endowed with intellect and free-will and immortal. All men are descended from Adam (q.v.) and Eve. Like the Angels, our first parents were also raised to a supernatural state by the infusion of sanctifying grace into their souls, being made adopted children of God, destined to the enjoyment of the beatific vision. This is the principle of supernatural life, whereby man can produce works that merit a heavenly reward. Moreover, God bestowed on man other preternatural gifts: great powers of mind and infused knowledge, complete control of the passions, immortality and exemption from suffering and decay. This original justice our first parents lost by mortal sin, that is, by a grievous, wilful violation of God's law; in consequence of Adam's sin all of his descendants were deprived of those privileges, are conceived in original sin and cannot of themselves enter the kingdom of heaven.

To atone adequately for the grievous insult to God and to repair the evil done to mankind, the second person of the Trinity became man. Jesus is true God and true man, one Divine Person subsisting in two natures, divine and human, not by the conversion of Divinity into flesh, but by the assumption of humanity unto God. He was born of the Virgin Mary, who was truly the Mother of God and remained a Virgin in conceiving and bearing her divine Son and ever after till the end of her life. By singular privilege of God through the merits of Christ, the Redeemer, the Blessed Virgin was preserved free from original sin (q.v.), that is, in the first moment of her conception, when her soul was created, it was endowed with sanctifying grace. By further privilege she was never guilty of any actual sin, mortal or venial. See MARY; IMMACULATE CONCEPTION.

Christ, the God-man, became our Redeemer, not by the mere effect of His preaching and example, but by His bloody death on the cross. He made Himself our mediator with His Father, offering atonement for the sins of all men. This satisfaction is not applied to those who have use of reason without their free employment of the means ordained by Christ. He merited for us the remission of sins, sanctifying grace and all other graces conferred on man. After His death, He rose again on the third day, ascended into Heaven, where He sits at the right hand of the Father, whence He shall come with glory to judge the living and the dead, and of His kingdom there shall be no end. He founded a Church and confided to it the task of teaching His doctrines and applying to men's souls the means of sanctification. This Church is the guardian and interpreter of revelation; for though the existence of God can be known with certainty by the light of reason, it has pleased the Divine Wisdom to reveal many natural truths as well as all those that regard our supernatural life. This revelation is contained both in written books and in unwritten traditions. The books of the Old and New Testament, held by the Church to be sacred and canonical, were written by the inspiration of the Holy Ghost and have God as their author. In matters of faith and morals the true meaning of Scripture is that which is maintained by the Church. All interpretations at variance with the unanimous consent of the Fathers, when they speak as witnesses of tradition, are false and forbidden.

Whatever is presented to us by the Church as revealed truth must be accepted by the free assent of the intellect, not because of its intrinsic truth seen by the light of reason, but on the authority of God who has given the revelation, and who can neither be deceived nor deceive. This divine revelation has been made credible by external proofs, especially by miracles and prophecies; yet as faith is a supernatural virtue, the act of faith requires the assistance of divine grace, enlightening the intellect and strengthening the will and making our act supernatural. Without faith there is no justification, but as God wishes all men to be saved, all receive, either proximately or remotely, the grace to believe. Among revealed truths some are mysteries that cannot be demonstrated by human reason, but must be believed. The demonstrations of reason cannot contradict revelation, hence any assertions of human science that are at variance with what the Church teaches to be revealed must be false.

As grace is necessary for the beginnings of faith, and even for the pious affection toward believing, so it is needed to make our good

works deserving of a supernatural reward. Grace is needed even for the just to avoid sin. Final perseverance is a special privilege of dying in the state of grace. Apart from a special revelation, no one can know that he will receive this blessing. Without grace, however, it is possible to resist less urgent temptations and perform acts that have natural goodness; hence all works done before justification are not sins. According to Catholic doctrine, actual grace is a real influence exerted by the Holy Ghost upon the soul, but it does not destroy the free-will of man. A grace may be fully sufficient for a supernaturally good act, but if a man refuse to act with it, the grace will not be efficacious. God will not save us without our co-operation. See GRACE OF GOD.

Actual graces aid us to obtain habitual or sanctifying grace, that is, to be justified by the remission of original sin or of grievous actual sin. This sanctifying grace makes us like unto Christ, holy and supernaturally pleasing to God, and brings with it the infused virtues and the gifts of the Holy Ghost (q.v.). There are many grades of habitual grace; it may be increased by good works, and on the other hand may be entirely lost by mortal sin. God in His mercy offers to man supernatural happiness and makes this offer known by the preaching of His Church, which he accompanies by an interior stirring grace. When a man co-operates with this grace, he believes the truth with absolute certainty and is moved by the thought of God's love; he sees reasons to fear God's justice and throws himself on God's mercy, trusting in the merits of Christ; hence he conceives a love of God and a detestation of sin. Thus by the working of grace and the co-operation of man's free will, the way is prepared for justification; and, provided that man puts no obstacle, the Holy Ghost works this justification by infusing charity into his soul, thereby destroying sin. Thus purified, he enters on a virtuous life, hoping by the merits of Christ to enter heaven, but he has no absolute certainty of his salvation.

In the process of justification, the first grace cannot be merited at all; for no supernatural reward is due to natural acts. With the aid of grace both sinners and just can merit further actual grace, but only congruously and not with any strict right in justice. The just, that is, those in a state of grace, can merit final perseverance congruously, and, because of God's promises, can merit in justice the increase of habitual grace, eternal life and increase of glory. By mortal sin, all merit is lost.

As a means of justification Christ has entrusted to His Church seven Sacraments (q.v.), or sensible rites, instituted by Him to effect in the soul the grace which they signify. When the necessary conditions are placed, the Sacrament works by its own efficacy and not through the piety of the minister nor of the recipient. The Sacraments are Baptism, Confirmation, Holy Eucharist, Penance, Extreme Unction, Holy Orders and Matrimony. Baptism and Penance remit sin; the others cannot lawfully be received in mortal sin. Baptism, Confirmation and Holy Orders can be received only once, because they imprint on the soul an ineffaceable mark, called the sacramental character. All the Sacraments, if properly received, give sanctifying grace or increase it, if already in the soul. Since the promulgation of the Gospel, justification cannot be obtained without Baptism of water, which blots out original sin and all actual sin. Infants who die without Baptism cannot enjoy the supernatural vision of God. In adults, when Baptism of water cannot be received, pardon of sin can be obtained by the baptism of desire, which consists in a perfect love of God and a sorrow for sin, including, at least implicitly, the desire of the Sacrament. Remission of sin is also granted to all who suffer martyrdom for Christ. Sins committed after Baptism are remitted by the Sacrament of Penance (q.v.), in which the sinner confesses with contrition all his mortal sins to the duly authorized priests of the Church, from whom he receives absolution. Sins are also remitted by perfect contrition, but the obligation of Divine Law requires that even then, if possible, they must be confessed. Penance pardons the guilt of sins confessed and repented of, infuses or increases sanctifying grace, remits eternal punishment, if it was due, secures actual graces to avoid sin in future, and may also remit, wholly or in part, the temporal punishment still to be undergone for sins the guilt of which has been pardoned. The whole punishment is not always remitted with the fault; for the remaining debt satisfaction is made to God by sufferings patiently borne or voluntarily inflicted. For this purpose also the Church has the power of granting indulgences which are not a remission of sin, much less a permission to commit sin, but the remission of the whole or part of the temporal punishment which may be due for sins, after the guilt has been pardoned. See INDULGENCE.

In the Holy Eucharist there is really and substantially present the Body and Blood, Soul and Divinity of our Lord Jesus Christ, under the appearances of bread and wine. By the words of the priest at the consecration, there is effected a conversion of the whole substance of the bread into the Body and of the whole substance of the wine into the Blood, which conversion is called transubstantiation (q.v.). By force of the words, the Body is under the species of the bread and the Blood under the species of the wine, but in virtue of the natural connection and concomitance by which the parts of Christ are linked together, He exists whole and entire under each species and every part of the species. In the Mass (q.v.) there is offered to God a true, proper and propitiatory sacrifice for the living and the dead. To offer up this sacrifice, Christ instituted a visible and external priesthood and the Sacrament of Holy Orders (q.v.); the minister of this Sacrament must be a bishop, who has received the fullness of the sacred ministry. The various orders constitute the Hierarchy. Priests cannot ordain or confirm. Other orders are the diaconate, subdiaconate and the minor orders (Acolyte, Exorcist, Lector and Ostiarius). Before the minor orders, the tonsure is conferred as a sign of enrolment among the clergy, who are separated from the rest of the faithful, called the laity. The right to exercise the sacred functions within appointed limits is called jurisdiction; it is required for the lawful performance of all functions and for the validity of some. The Roman pontiffs have, by Divine institution, universal jurisdiction. The other bishops have power to govern the

dioceses to which they have been assigned by the Pope.

Marriage between Christians was raised by Christ to the dignity of a sacrament. Its essence lies in the contract freely made between man and wife; the grace conferred is first an increase of sanctity, and, secondly, actual grace to fulfill the duties of the married state. The bond of Christian marriage after consummation is absolutely indissoluble; it is also exclusive, no man can have several wives, no woman several husbands, at the same time. Those who, with the aid of God's grace, fulfil the obligations of virginity or celibacy live in a state more holy and better than the state of matrimony. From the fact that Christian matrimony is a Sacrament, it follows that it has been entrusted to the Church and is subject to the laws of the Church, not to those of the State; hence the Church has the power of assigning conditions necessary for the validity or lawfulness of the contract between those who have been baptized. See MARRIAGE.

The means of sanctification are given to men to enable them to live and die in the state of sanctifying grace. At the hour of death each soul is judged by Christ, and if in mortal sin, is condemned to hell to be punished by eternal torments, varying in intensity according to the degree of guilt. Those who die free from all sin, mortal and venial and from all the temporal punishment for sin, are admitted at once to life everlasting, to perfect beatitude in the vision of God. The saints and angels in heaven offer up prayers for men, and it is good and useful to invoke their intercession that we may obtain favors from God through Jesus Christ, who is our sole Redeemer and Saviour. Catholics honor and worship the saints and angels, and especially the Blessed Virgin Mary, because God loves and honors them, and because of their own personal sanctity; not, however, with the supreme worship that belongs only to God. Because of their special connection with holy persons, honor is also given to relics of the saints, to images and paintings of Christ and His saints. If men die in venial sin, or temporal punishment be still due, their souls are detained in purgatory (q.v.) until expiation is made. In this state they can no longer merit for themselves, but can be assisted by the prayers and good works of the faithful and particularly by the holy sacrifice of the Mass. The Church has the power to apply indulgences for their relief. In addition to the particular judgment, immediately after death, there will be a general judgment at the end of the world. The body will rise from the grave reunited to the soul, and share for eternity either happiness in heaven or punishment in hell.

The chief duties of Christian life are expressed in the Ten Commandments of God and the commandments of the Church. Many laws have been imposed by the Church on particular classes or for special purposes; all Catholics, however, are bound, under pain of mortal sin, to hear Mass and rest from servile work on Sundays and Holydays of obligation, to fast and to abstain from certain food on the days appointed, to confess all mortal sins at least once a year and to receive the Holy Eucharist during the Easter time.

A Catholic must believe all the truths God has revealed and teaches through His Church. Denial of one such would mean either the denial of God's veracity or of the Church's infallibility. But it is not necessary that he should know explicitly more than the principal truths; all others are included in his acceptance of the Church as a divine teacher, alone capable of declaring what truths are contained in the *deposit of faith* handed down from the apostles. The definition of a dogma by the Church brings no change in doctrine; for no truth once taught as of faith is ever given up nor can any point be added which was not contained, at least implicitly, in the original teaching. However, the Church's infallibility is not limited merely to revealed doctrines; she can also speak infallibly on matters necessary to safeguard revealed teaching. Belief in such decisions is called ecclesiastical faith. Outside the domain of divine or ecclesiastical faith, there are many subjects of pious belief among Catholics. Some of these may perhaps belong to the deposit of faith, but they are not yet authoritatively proposed. Others depend on human testimony, and are accepted with that degree of certitude which the testimony warrants.

In the expression of revealed truths and in the defense of faith from the charge of conflict with demonstrated truths of science and philosophy, the Church makes use of terms derived from the philosophy current among its subjects. Thus it has come about that the dogmas are expressed in the terms of scholastic philosophy and officially in the Latin language. As its doctrines can be taught in any language, so, too, the expression of them may be harmonized with whatever is found to be true in any system of philosophy.

In the worship, liturgies, discipline and practices of the Church, some regulations may be of divine origin, others are of ecclesiastical origin, and still others arise from the voluntary piety of individuals. Besides the ordinary obligations of Christian life, she invites those of her children who feel the call from God to bind themselves by vow to His service. The principal vows are those taken to observe the evangelical counsels of poverty, chastity and obedience. Those who have thus bound themselves in approved congregations or religious orders are called *religious*. (See ORDERS, RELIGIOUS). As a matter of discipline all those in Sacred Orders in the Latin portion of the Church are bound to observe celibacy. In the Greek portion, to-day, no priest can marry, but married men may receive Holy Orders, except episcopal consecration.

External Organization of the Church.— Supreme jurisdiction, as we have seen, resides in the Pope; the bishops are the rulers of dioceses, which are subdivided into parishes or missions under a parish priest or rector, assisted by curates. The dioceses are united into provinces, over each of which is an archbishop or metropolitan, the other bishops being called his suffragans. The archbishop convokes provincial synods, hears certain appeals from the episcopal court, watches over the observance of ecclesiastical law in some particulars, and, under certain circumstances, appoints an administrator when a suffragan dies. The patriarchate is to-day only an honorary rank. The Pope is represented in some countries by apostolic delegates, to whom are referred appeals from the lower courts and through whom the

Pope sends his communications. In some countries there are apostolic nuncios, who deal directly with the various governments that have their representatives at Rome.

The Pope is assisted immediately by the Sacred College of Cardinals and by the Sacred Congregations. The College of Cardinals, when complete, contains 70 members: 6 Cardinal Bishops of the Suburban Sees, 50 Cardinal Priests and 14 Cardinal Deacons. The Sacred Congregations, 21 in number, are committees of Cardinals to whom special affairs are entrusted. They were arranged, almost as at present, by Pope Sixtus V. The Cardinals alone cast votes for the final decisions, but they are assisted by secretaries and consultors. The Pope himself acts as prefect of some congregations (the Inquisition, the Apostolic Visitation and the Consistorial). A Cardinal presides over each of the others. The acts of all congregations are submitted to the Pope for his approval. These acts, unless promulgated in a solemn manner as the acts of the Sovereign Pontiff himself, are subject to change; though not infallible, they must be received by the faithful with an internal assent, such as is due to religious authority and obeyed as laws of the Church. The more important congregations are: the Holy Roman Inquisition (the supreme tribunal to judge of heresy and crimes allied with heresy), the Consistorial (which selects the matters that are presented and sanctioned by the College of Cardinals assembled in the Papal Consistories), the Apostolic Visitations, Bishops and Regulars, and Council of De Propaganda Fide (which cares for missionary countries), Sacred Rites, the Index (which prohibits the reading of books condemned as contrary to faith or good morals), Indulgences and Relics, and the congregation of Studies.

The Church and Civil Authority.— The Church was established by Christ as a perfect, independent religious society. Its authority depends on God's ordinances alone; wherefore it has always denied any right on the part of the state to interfere in its internal affairs. In Catholic countries, the Church claims immunity for its officials from the authority of civil tribunals; in past ages this immunity was often absolutely necessary for their just protection. Sometimes the Pope makes a Concordat with temporal rulers; that is, a treaty whereby, in consideration of certain promises of these rulers, the Pope abstains from urging certain of his rights. To exercise the prerogatives which we have described, the Pope, his Cardinals and other officials must be exempt from the jurisdiction of any civil tribunals. Practically this cannot be secured without the Temporal Power (q.v.), or better, the Temporal Independence of the Sovereign Pontiff. It is not enough for the Pope to be free, he must be known to be free; suspicion of being under the influence of a sovereign would be fatal to his influence. This independence he possessed for more than 15 centuries; it was assured by the recognition of his sovereign authority in the states of the Church. Since the usurpation of these states by the Italian government, the Popes, Pius IX, Leo XIII and Pius X, have not ceased to proclaim: (1) That this seizure was an act of injustice; (2) that the Pope no longer possesses the freedom, security and independence demanded by his dignity, his rights and for the proper exercise of his authority; and (3) that the Holy See must insist on these facts and look forward to some efficient remedy for the injustice and indignity of present conditions. To deal rightly with Catholics of all nations, the Pope must be extra-national. As the seat of our general government, the District of Columbia, is independent of all the States, so the seat of the general government of the Church should be independent of all the countries of the earth.

History.— The history of the Roman Catholic Church may be divided into three great epochs: (1) Christian Antiquity, embracing the first seven centuries, during which Christian civilization was chiefly Greek and Roman. (2) The Middle Ages, from the 8th century to the 16th, characterized by the Church's action among the various peoples of north and central Europe, who were molded into organized nations by her influence. (3) The Modern Age, from the rise of Protestantism to the present day, during which the Germanic nations separated from the Church and attached themselves to various sects, and the Church has had to struggle against the modern, infidel spirit in science and government.

The first epoch contains two periods. First comes an era of persecution, during the struggle with paganism, which was terminated by the edict of Milan (313); then, an era of development in definitions of dogma against the attacks of heresy. The second epoch embraces four periods: I. The conversion of the barbarians. II. The development of the Western Empire and the Church's struggle to maintain her independence (800–1073). III. The supremacy of the Church maintained (1073–1300). IV. Attacks on the Church's supremacy, from Boniface VIII to Protestantism.

During the third epoch three periods may be distinguished: 1. The period of religious warfare, ending with the Peace of Westphalia, 1648. II. From 1648 to the French Revolution, the era of established Churches. III. Dawn to the present day: Neo-paganism in science and life, the age of unrestrained freedom to accept or deny the truths of religion.

Even while the Church was undergoing cruel persecution, she was also developing her discipline and defending her doctrines against the pagans and heretics. From the first three centuries have come down to us the valuable works of Ignatius, Polycarp, Justin, Clement of Alexandria, Origen, Tertullian, Cyprian and many others. The mightier struggle with heresy, and her marvelous growth after she emerged from the catacombs, gave renown to Athanasius, Basil, the Gregories in the East and West, Chrysostom, the Cyrils, Hilary, Ambrose, Jerome, Augustine, Leo and a host of other Christian writers, of whose works the modern world knows very little. The growth of monasticism is one of the glories of this age. Monks and nuns consecrated their lives to God's service by prayer and study and labor, thus preserving the ancient civilization from utter destruction by the barbarians, and preparing for the Church the means of converting these barbarians and transforming them into the civilized communities of Europe. The intimate union which existed between Church and State gave rise to the Holy Roman Empire (q.v.) and to the great body of laws by which their

mutual relations were regulated. Frequent attempts were made later to subject the Church to the Empire. They were frustrated by the Popes, and especially by Gregory VII, after whom comes the glorious period of vigorous life and eminent learning. Among the orders that were then founded we may mention the Carthusians, Cistercians, Franciscans, Dominicans and Servites, fruitful in numerous saints and scholars. The Church boasts of Saint Anselm, Peter Lombard, Albertus Magnus, Saint Thomas Aquinas, Saint Bonaventure, Duns Scotus, Saint Bernard and others. It was also the age of Crusades (q.v.) for the recovery of Palestine. The 14th and 15th centuries are noted for the revival of interest in pagan literature, the sad exile of the Popes at Avignon and frequent movements to effect a much-needed reformation of morals. In this work, many rejected the divine authority of the Church and were cast out as heretics; they are generally regarded as forerunners of Martin Luther (q.v.), who succeeded in separating whole sections of Germany from the Church, and became the occasion for the counter reformation that was effected by men like Francis de Sales, Ignatius Loyola and Peter Canisius during the 16th century, and especially by the great work of the Council of Trent (1545–63). In this same period, millions of pagans were brought into the Church by the heroic labors of her missionaries, notably in South America, India, Ethiopia and Japan. England, under Henry VIII and Elizabeth, renounced the supremacy of the Pope, made a state religion of its own, and by the penal laws almost annihilated the Catholics. France remained Catholic, but, becoming infected with Jansenism and Gallicanism (qq.v.), and later with atheism and socialism, brought about the utter disorganization of Continental society. In the reconstitution of the shattered nations, Napoleon (q.v.) thought to make the Papacy his tool, and thus ruin the Church; but he failed, and the 19th century witnessed the gradual revival of the Church in almost all European countries, and its stupendous growth in the United States and other English-speaking countries. Catholic emancipation in England (1829), the Tractarian movement (see TRACTARIANISM) in the Established Church, that resulted in so many converts to Rome, and the restoration of the Catholic hierarchy (1850), have given Catholics prominence in English life. In France, though the people are loyally Catholic, the government is engaged in controversy with the Church and in the attempt to control Catholic education. When the French garrison was withdrawn from Rome in 1870, the Papal states and the city of Rome were annexed and added to the Italian kingdom. For the past 34 years the Pope has never left the Vatican Palace. Shorn of their earthly kingdom, Pope Pius IX (q.v.) and Leo XIII (q.v.) witnessed the attempt of Bismarck (q.v.), in Germany, to subject the Catholic Church to the state; but they witnessed also the failure of the attempt and the repeal of almost all the iniquitous laws. Persecution served only to unite all Catholics and revealed to them the power of united action. In continental United States the Church has grown from 244,500 in 1820 to 17,416,303 in 1918. This great increase has been due mainly to immigration from Europe and Canada. Irish, Germans, French Canadians, Italians, Poles and Bohemians have come in large numbers. Meeting with no official opposition, the Church has prospered and is regarded even by many non-Catholics as a strong power for the preservation of the republic from the new social dangers that threaten the United States as well as the whole civilized world.

The activity of the Church in the mission field was almost destroyed by the wholesale confiscations of the French Revolution. As soon as order had been established in Europe, the missions revived, and, especially since Gregory XVI, have spread to every land of the world. Dioceses are mapped out and bishops appointed as soon as the circumstances warrant. The reorganization of the Congregation *De Propaganda Fide* by Pius IX, with separate sections for the Latin and the Oriental Churches, has been of great advantage. College, institutes and special religious congregations have been founded in various cities of Europe for work in the foreign missions. The Association for the Propagation of the Faith is the largest of the societies among the laity for the collection of funds. Missions are also conducted with success in the Oriental Churches in communion with the Holy See. These Churches hold the same doctrines as the Latin Church, but have special rites, discipline and liturgical language. There are four chief groups: I. The Greek, subdivided into Greek proper, Melchite, Slav (which is Ruthenian and Bulgarian) and Rumanian. II. The Syrian, subdivided into Syrian proper, Syro-Chaldean (which also included the Malabar) and Maronite. III. The Coptic, which is Egyptian and Abyssinian or Ethiopian. IV. The Armenian. Pope Leo XIII was much interested in these eastern churches, and had the joy of receiving many converts into communion. For bibliography see article CATHOLIC CHURCH IN THE UNITED STATES.

JOHN J. WYNNE, S.J.

CATHOLIC CHURCH, Roman. Recent Growth and Statistics.— To-day the Catholic Church contains within its fold 294,583,000 souls, or about 48 per cent of the entire Christian population of the globe. It is found in all continents and among all nations but is strongest in southern countries and among the Latin and Celtic races in Italy, Spain, France, Austria, Ireland and South America. Its history during the 19th century discloses the remarkable fact that while it lost somewhat on its own ground, especially in France and Italy, these losses have been more than offset by the gains throughout the English-speaking world, especially in the United Kingdom, the United States and Australasia. In England the conversion of Newman, Manning and others was the beginning of a movement which brought and still brings thousands into the Catholic Church.

Pope Pius IX took official cognizance of the movement by re-establishing the Roman Catholic hierarchy in England in 1850. The growth of the Church in Holland led to a similar re-establishment of the hierarchy there in 1853. The Irish emigration to Scotland after 1847 led to a great increase in the number of Catholics in that country, where the Oxford movement also exerted considerable influence

and in 1878, Leo XIII re-established the Catholic hierarchy there. Great and numerous, however, as were the gains in the Old World, they were greatly overshadowed by the vast growth and spread of the Church in the New and in the British dominions overseas. The Irish famine of 1846–47 caused millions to emigrate from that country to the British colonies and to the United States and to these emigrants and their descendants are to be ascribed the flourishing condition of the Church to-day in Australia, New Zealand, Canada and South Africa. In the United States the Church, in addition to the Irish immigrant, was reinforced also by immigration from Catholic Poland, and the Kulturkampf of the seventies in Germany caused great numbers of German Catholics to seek religious freedom in the Great Republic of the West. In later years Moravians, Copts, Ruthenians and Greeks have been added in ever increasing number to the Catholic forces in the United States. In Canada, the growth of the French-Canadian population, Irish immigration and the settlement of great numbers of the Catholic Gaels of Scotland have placed the Church of the Dominion in a flourishing condition. In Latin-America, the losses incurred during the breaking up of Spain's colonial empire and the establishment of new autonomies have been repaired. The Church is well organized in those countries and while it labors under annoying restrictions in some of the republics, it is in the main at liberty to proceed in its work of evangelization. Millions of aborigines have come within its fold and as of old its missionaries still labor on the outposts of civilization.

We are thus face to face everywhere in the modern world with an organization stretching in unbroken succession back to the palmy days of heathen Rome; an organization which has outlived all the governments and dynasties of Europe, and is likely to see the end of the national groups as at present constituted. Its losses in the Old World it has recouped in the New; its vitality and energy are evidently unimpaired; in general culture and intelligence it is the equal, while in eleemosynary and reform work in our complex modern social life it surpasses most other Christian denominations. It has a rich and remarkable history and still exercises a greater power over the masses of the people than any other body of Christians. The 294,583,000 Roman Catholics in the world are distributed as follows: Europe, 183,760,000; Asia, 5,500,000; Africa, 2,500,000; North America, 50,000,000; South America, 44,623,000; Oceania, 8,200,000. The estimated number in the chief countries of Europe in 1918 was: Austria, 26,000,000; Hungary, 13,000,000; Belgium, 7,000,000; Denmark, 9,821; France, 35,000,000; United Kingdom, 6,000,000; Greece, 35,000; Sweden, 2,378; Italy, 32,983,664; Netherlands, 2,053,021; Norway, 2,046; Portugal, 5,597,985; Russia, 11,467,994; Switzerland, 1,593,538; Spain, 20,325,986; Germany, 24,000,000. In Egypt are 706,000 Copts who are in union with the See of Rome.

In 1918 there were 24,922,062 Catholics under the United States flag. Of these, 17,416,303 were in the United States proper, 7,285,458 in the Philippines and 1,072,495 in Alaska, the Canal Zone, Guam, American Samoa, Hawaii, Porto Rico and the Virgin Islands. There were 19,572 Catholic clergymen in the United States, of whom 14,318 were secular clergy and 5,254 were members of religious orders. There were 10,058 Catholic churches with resident priests, 5,105 mission churches, 85 seminaries with 6,201 students preparing for the priesthood, 112 homes for the aged, 210 colleges for boys, 685 academies for girls and 5,588 parochial schools. In the parochial schools were enrolled 1,497,949 children. The Catholic orphan asylums number 283, with 48,089 orphans. See CHRISTIAN CHURCH, DIVISIONS AND STATISTICS OF THE.

JOHN B. MCDONNELL,
Editorial Staff of The Americana.

CATHOLIC CHURCH, Social Service in the. Definition.—Etymologically, the phrase social service comprises all activities for the benefit of social groups. In modern usage, however, it is restricted to works on behalf of the more needy and weaker sections of the population, and to benefits that are mainly physical, although it does include certain intellectual and moral kinds of betterment. The present article will present the social service of the Catholic Church under the heads of charity and social reform.

Doctrinal Viewpoint.— A few words concerning the doctrinal attitude of the Church toward social service will help us to understand her practice. In the first place, the Church does not conceive her mission as primarily that of reforming society or improving the temporal condition of the individual. Her main and specific concern is with the individual's spiritual welfare. In old-fashioned terms, her function is to save souls by inducing men to avoid sin and live virtuous lives. In her eyes the temporal condition of the individual, whether it be of riches or poverty, of sickness or of health, of freedom or of bondage, is in itself comparatively unimportant. Even less is she concerned with the forms of social organization, with economics, or with politics. She knows that men have served God faithfully and saved their souls in every kind of individual and social condition, and she holds that no temporal condition has value or importance except in so far as it conduces to union with God in this life and in the life to come.

This attitude is based on the words of Christ and on the Christian tradition. Throughout the Gospels the Founder of Christianity lays supreme emphasis upon the life of the spirit and the transcendent value of eternity. He neither attempted to found nor directed His followers to found a new social system. So little value did he attach to temporal goods that He counseled the seekers after perfection to give up their material possessions. "Seek ye first the Kingdom of God and His justice." "What doth it profit a man if he gain the whole world and suffer the loss of his soul?" "If thou wouldst be perfect, go, sell what thou hast and follow me." All through her history the Church has maintained this same attitude and held to this comparative estimate of temporal and eternal values.

Nevertheless, the Church has always held that social service is among her ordinary functions. While maintaining that corporal works of mercy are not her supreme mission, any more than they are the main business of the individual, she never allows either herself or

her children to forget that charitable assistance is frequently necessary to enable the individual to live righteously. In other words, the Church values social service not as an end but as a means. Since men cannot serve God and prepare themselves for eternity without a certain amount of physical, intellectual and moral goods, she does all that is within her power to assist them in these respects. It is in this sense that she interprets the second of the two Great Commandments, that of loving the neighbor as the self, as well as all the other injunctions of Christ concerning charity toward our fellowmen. These commands she imposes upon all her children and strives unceasingly to fulfill herself. And she believes that when social service is performed in this spirit, and from this motive, it will be more extensive and more efficacious than when it is undertaken on grounds of mere humanitarianism. She believes that the most effective basis of social service is to be found in the eternal values of God and the soul.

Charitable Activities.— The superiority of social service conceived as active love of the neighbor for the sake of God is clearly manifest in the history of charity in the Church. In the words of the rationalist writer, Lecky, "Christianity for the first time made charity a rudimentary virtue, giving it a leading place in the moral type, and in the exhortation of its teachers." ('History of European Morals,' II, 79). Some of the principal effects of this conception upon society may be summarized as follows:

In the most civilized countries of the ancient world the prevailing theory of social relations was that expressed by the Roman poet Lucan, "paucis vivit humanum genus" ("the human race lives for the few"). A very small minority possessed all wealth and power in society, and the great mass lived in misery. The individual as such was not accorded rights, dignity or sacredness; a large proportion of the population were slaves, whose sufferings make the condition of the negro slaves of the United States look like paradise; the lot of the great mass of the free persons was little better socially and economically than that of the slave population; and if the hunger of the poor was sometimes relieved by public gifts of corn, the motive was not pity nor brotherly love, but the fear of revolution. Within a few centuries the Christian teaching that all men are persons and therefore essentially equal, that all are brothers in Christ with the same eternal destiny, and that the possessors of superfluous goods are morally bound to distribute them among the needy,— led to the mitigation and substantial abolition of slavery in Christian countries, to the recognition of labor as something honorable instead of degrading, and to a marvelous variety of organizations and works for the relief of distress.

From the beginning the care of the poor was accepted as one of the primary duties of the Church. Every parish had a special organization and special funds for the discharge of this function. The possessions of the Church were called "the patrimony of the poor," and one of the four divisions of its revenues was definitely set aside for poor relief. In the second half of the Middle Ages the chief dispensers of all kinds of charity were the monasteries. Indeed, the main reproach brought against the social service of these institutions is that they were too generous. Certain religious communities owe their foundation to the desire to relieve certain special forms of distress. Thus the Brotherhood of the Holy Spirit, the Knights of Saint John and the Hospitalers devoted their energies to the erection and care of hospitals, and the order of Saint Lazarus provided houses for the care of lepers. The Alexian Brothers were mainly concerned with the burial of the dead. The Trinitarians ransomed thousands upon thousands of captives. The Fratres Pontifices built roads and bridges, and in other ways strove to make traveling safe. The Franciscans preached and practised a wholesome poverty and induced the rich to share their goods with the distressed. One of the most important functions of the craft and merchant guilds was to make adequate provision for the insurance and relief of their needy members.

The extent to which hospital building was carried may be judged from the fact that as early as the 6th century there was one in almost every city of the Roman empire; that the hospital of the Holy Spirit, founded by Pope Innocent III at the beginning of the 13th century, accommodated 1,500 patients; that in the later Midde Ages there was hardly an important town in Germany that did not have one or more of these institutions, while there were 20,000 of them in France. And it must be remembered that the mediæval hospitals were not merely places for the treatment of the sick, but for the refuge and care of the homeless poor, the aged and orphans and widows.

One of the chief duties of the bishops has always been the care of orphans. They were provided for either in separate institutions or in connection with hospitals and monasteries. Owing in great measure to the zeal of Saint Vincent de Paul, orphanages became so general that 300 of them were to be found in France on the eve of the Revolution.

In the later Middle Ages institutions known as "montes pietatis" were established by the thousand under the direction of the Church in Italy, France, Belgium and Germany. Their object was to loan money to the poor with no other charge except for the cost of administration. In an age when borrowers were largely at the mercy of rapacious usurers, this was not the least important performance of social service.

The charitable activity and efficiency of the Church in the period of its greatest influence may be fairly summarized in the words of Prof. S. N. Patten: "It provided food and shelter for the workers, charity for the unfortunate, and relief from disease, plague and famine, which were but too common in the Middle Ages. When we note the number of the hospitals and infirmaries, the bounties of the monks, and the self-sacrifice of the nuns, we cannot doubt that the unfortunate of that time were at least as well provided for as they are at the present." ('The Development of English Thought,' pp. 90, 91).

At the present time the relief of physical distress outside of institutions is carried on mainly by the parish churches and by charitable societies. In every Catholic church in the cities will be found a box near the entrance into which the faithful are requested to drop

their offerings for the poor. This money and all other funds that come into the hands of the pastor for the same purpose are administered for the benefit of the needy by him individually or in co-operation with competent persons and associations. Through this method it is easily possible to reach every case of distress. While the number of such cases is somewhat too great for the available resources, the parish organization of relief is in itself admirably adapted to perform its task comprehensively and in detail.

Among the Catholic associations devoted to the relief of the poor, first in importance is the Society of Saint Vincent de Paul. Founded in Paris in 1833 by Frederic Ozanam and seven companions, it has extended throughout Europe and North and South America, and has branches in many parts of Asia, Africa and Australasia. Its main features are the personal activity of its members among the needy, the emphasis that it places upon improving the moral and religious as well as the material condition of those who are assisted, and the exceptionally small cost of administering physical relief. In proportion to its members and resources it is probably the most efficient relief society in existence. The Elizabethan associations of Germany are composed entirely of women. They have some 550 branches or conferences and give assistance to between 10,000 and 12,000 families annually. In one diocese of Germany, Cologne, there are 162 charitable societies with 3,000 members. A federation of all the Catholic charitable societies of Germany was organized in 1897 with a central bureau in Freiburg. It holds conferences, makes investigations, issues publications and co-operates with many non-Catholic and secular charitable movements. France has more than 4,000 Catholic charitable societies. In the United States the Queen's Daughters Society has branches in many States and cities, and a local women's charitable organization exists in probably the majority of urban parishes. Frequently the latter are federated into a league or guild which represents the entire city. In 1910 the National Conference of Catholic Charities was organized and held its first sessions in Washington. It meets biennially. At the meeting in September 1916, 500 delegates were registered, representing 78 cities and 28 States. The papers read at these meetings are generally of a high order, and evince a sustained endeavor to know and utilize all that is best in modern methods of charity.

A few brief indications will here be set down of the charitable work of the Church in institutions. Nothing like a complete account is attempted; only a statement of types. For the care and treatment of sick and defectives there exists a great variety of hospitals and homes. The United States alone has more than 400 general hospitals under Catholic direction, whose patients in 1916 exceeded half a million, 5 institutions for the blind, 13 for deaf-mutes and 3 for feeble-minded persons. The principal institutions for the care of wayward and delinquent girls are conducted by the Sisters of the Good Shepherd, who have more than 250 establishments in Europe and the United States. Reformatories for boys are managed by the diocesan clergy and by religious communities. As examples of these may be mentioned the Catholic Protectory of New York (1,500 inmates), Saint Mary's Industrial School of Baltimore (1,500 inmates) and Saint Mary's Training School of Chicago. Institutions for the helpless, such as orphans, infants, foundlings and aged persons, are found in the majority of dioceses. In 1916 the Catholic Church in the United States had 293 orphan asylums with more than 45,000 inmates, 106 homes for the aged, some 35 infant asylums and 30 homes for destitute children. In recent years the movement for the establishment of day nurseries, homes for workingmen and workingwomen and social settlements has been considerably accelerated among the Catholics of this country. Education, secular, religious and moral, is an important accompaniment of the physical care given in all Catholic institutions for young people.

Social Reform.—The modern Catholic movement for social and industrial reform originated with Baron Von Ketteler, bishop of Mainz from 1850 until his death in 1877. His first important work in this field consisted of six sermons, delivered in the cathedral of Mainz in 1848 on the Catholic doctrine of property and the duties of Christian charity. Aside from the thesis that the sociology of Saint Thomas Aquinas was sufficient to meet every social need of the 19th century, the most striking element of these discourses was the proposition that social questions were more important than political questions. Although we of to-day recognize this statement as a truism it had a strange sound in that year of political revolutions, 1848. «If we wish to know our age,» said the speaker, «we must endeavor to fathom the social question. The man who understands that knows his age. The man who does not understand it finds the present and his future an enigma.» In 1864 he wrote 'The Labor Question and Christianity,' which advocated labor associations and co-operative societies of production. In 1869 he proclaimed the necessity of increased wages, shorter hours and the prohibition of industrial labor in the case of women and children. A conference of the German bishops at Fulda in the same year endorsed his proposals for interesting the clergy in the condition of the working classes. In his last book, 'The Catholics in the German Empire,' he emphasized anew the duty of the state to promote the formation of workingmen's co-operative associations, to protect the workers, especially women and children, against unjust exploitation, and to enforce safety and sanitation in work places. These proposals were afterward embodied in the program of the Catholic party (the Centrum) in the Reichstag.

Next to Bishop Ketteler, the ablest leader of social reform among the German Catholics is probably Canon Hitze. He advocated a reorganization of industry on the basis of legally recognized occupational associations, which would be open only to persons who had passed a technical examination, and humane regulation of hours, safety and sanitation, woman and child labor, and other conditions of employment. As a member of the Reichstag he has been an active protagonist of many social reform measures. Father Kolping organized journeymen's clubs (Gesellenverein) to provide lodging and other club facilities for

their members, and for mutual protection generally. When their founder died in 1865 they had a membership of 80,000.

The Catholic associations for co-operative production, advocated so strongly by Bishop Ketteler, never met with much success, owing to the difficulty of obtaining capital. Among the principal Catholic organizations that have become efficient are savings, credit and labor-protective associations; societies of peasants for promoting the interests of their members as regards prices of products, seeds, fertilizer, loans and co-operative effort generally; and organizations of employers to provide for the workers' education, improved dwellings, lower rents, relief and savings agencies, limitation of working hours, hygienic conditions and Sunday rest, and to promote better relations between employers and employees. Indeed, one of the most remarkable features of the German Catholic social movement has been the number of wealthy men in its ranks. They provided a very important part of the initiative as well as the financial resources.

The greatest general force in promoting Catholic social action in Germany has been the popular congresses which have been held annually since 1848. As the years followed one another they gave more and more attention to the social question. Before long it was found that meetings held once a year were not sufficient, that an organization was needed which should be in action continuously. To meet the situation the Volksverein was founded in 1892 by Ludwig Windthorst, the great leader of the Centre party in the Reichstag. It formulated a constructive social program and set to work systematically to educate the German people in Catholic social principles. The organization contains a director for each state or diocese, a manager for each town or collection of villages and a promoter for every 20 to 50 Catholic families. The promoters number 20,000 and each of them comes into frequent personal contact with each of the families in his jurisdiction. In 1903 the Volksverein distributed 13,500,000 tracts and pamphlets and furnished bi-weekly contributions on social and economic subjects to 361 Catholic periodicals. It also conducts annual courses of study in economic and social subjects, and its representatives in the Reichstag have contributed effectively to the enactment of workmen's insurance and old age pension laws and other statutes for the protection of labor in both city and country.

The Austrian Catholic social movement was inaugurated by Baron Von Vogelsang and Prince Von Lichtenstein. Both were strong in their denunciation of unlimited competition. In their view the doctrines and practices of economic liberalism were giving to the weaker members of society, the wage earners, only the freedom to be exploited by the possessors of the power of wealth and capital. Hence they conceived the first and most urgent reform to be measures which would protect the workers against this abuse of economic liberty and industrial power. And they maintained that this protection would have to come from the state.

Through the influence of the Catholic party a law was passed in 1883 re-establishing the corporations or guilds for the protection of labor in the smaller industries. Among the functions of these organizations were the maintenance of systems of apprenticeship, trade education, conciliation and arbitration and mutual insurance.

In 1885 the Catholic social reformers assisted in passing a law limiting the hours of labor of women and children and declared in favor of a legal minimum wage. Thus the Austrian Catholics were the first in the world to advocate the establishment of minimum wages by law. They were among the first to realize and proclaim the necessity of protecting labor by international agreements.

The greatest figure in the work of Catholic social reform in France is the late Count Albert de Mun. In the early seventies he founded the "Catholic Workingmen's Circles" ("Oeuvre des Cercles Catholiques"), which aimed at a restoration of the ancient guilds along lines suitable to modern conditions and under the direct approval and protection of the state. Underlying them are the doctrines that the policy of unrestricted competition and governmental non-intervention have reduced the masses to a condition of intolerable insecurity. This must be remedied through adequate and compulsory workingmen's associations. In 1884 the French government enacted a law providing for the establishment of labor syndicates, but it did not give them sufficient power to attain the objects of the Catholic reformers. About the same time de Mun offered, in the Chamber of Deputies, a program of labor legislation which included Sunday rest, a working week of 58 hours, abolition of night work for women, the gradual suppression of female and child labor in industry and insurance against accidents, sickness, unemployment and old age. A little later his group of reformers advocated a legal minimum wage which would be sufficient for the decent maintenance of the workingman and his family.

A particular experiment in social service that has assumed considerable importance in France is the establishment of workingmen's gardens. These are cultivated by industrial workers in the suburbs of cities. In 1905 such gardens furnished an important part of the livelihood of some 2,300 persons in the city of Fourmies alone, and of some 50,000 persons throughout France. The originator of the plan was the Abbé Gruson of Fourmies.

Another form of social service strongly advocated by the Catholics of France is that limited measure of industrial democracy which finds its best illustration in the factory of Leon Harmel. For more than 25 years a "board of control," composed of representative male and female employees, has met regularly with the employer to discuss their common interests.

The Catholic social reformers of Belgium have been, as a body, less advanced than those of Germany, Austria or France. Several of them have been rather fearful of the intervention of the state in this field. Among the leading names identified with the movement are Bishop Doutcloux of Liége, the Abbé Pottier, M. Perin and M. Brants. Before the war the Belgian Catholics had a powerful labor federation, co-operative societies and associations of employers. Among the principles of the "Belgian Democratic League" are the

inviolability of private property; a considerable modification of present property rights; the organization of guilds or trade corporations, with power to fix wages, hours and other conditions of employment, and to provide social insurance and old age pensions; co-operative purchasing and credit associations both in urban industries and in agriculture; and mixed associations of employees and employers.

The Catholic representatives in the Parliament of Holland took an important part in the establishment of boards composed of masters and workers which act as advisory bodies to the public authorities on matters affecting labor and which include agencies for the settlement of industrial disputes. In 1893 the "Catholic Democratic League" demanded the abolition of industrial work for married women, a family living wage for men, the prohibition of child labor, a weekly day of rest and insurance against accidents, sickness and old age. In 1897 the Catholic representatives in the national legislature drew up a program which, in addition to the foregoing demands, contained the following: laws for the regulation of apprenticeship, for laborers' dwellings and a shorter workday for men, women and children.

The founder of the Catholic social reform movement in Switzerland was Cardinal Mermillod, bishop of Hebron. In a sermon, delivered in 1868, he condemned the gross inequality of possessions that characterized the age and pleaded for an infusion of the principles of Christianity into the social and industrial situation. The most active and effective worker in the movement was Gaspard Decurtius. As member of the Swiss Parliament, one of his first acts was to oppose successfully the attempt to abolish the privilege of grazing on the common lands, which had been enjoyed for centuries by the poor peasants. Soon afterward he brought about the enactment of a law providing for the compensation of injured workmen. On this occasion he presented a report in which he advocates the legal establishment of a minimum wage which should be sufficiently high to provide not only for decent living, but protect the worker against sickness, accidents and all other unfavorable contingencies of life. He was also one of the originators of the movement for international labor legislation, which finally developed into the International League for Labor Legislation. In 1887 the Swiss bishops unanimously resolved that the clergy should be instructed to take an active part in the formation of labor associations. One of the most remarkable and effective elements in the policy of these associations has been their co-operation with non-Catholic agencies for protective labor legislation.

In Italy the Catholic social reform movement began somewhat later than in the countries discussed in the foregoing pages. The principal names connected with it are Padre Curci, Bishop Bonomelli, Cardinal Capecelatro and Signor Toniolo. Among the reforms demanded by the Catholic Congress in Rome in 1894 are the increase of small property owners, the exemption of small holdings from liability to seizure for debt, a living wage, profit sharing and copartnership, better credit facilities for small business men, the repression of speculation and usury, the re-establishment of workingmen's guilds or corporations and a moderate degree of intervention by the state. In recent years a considerable number of practical works have been inaugurated by Catholics in more than one section of Italy. For example, Bergamo has 45 societies for mutual insurance, a diocesan labor union, co-operative bakeries, mills and other industries, a co-operative building association, a people's bank and a wide distribution of social literature. The Federation of Catholic Rural Credit Banks embraces about 1,800 financial institutions of this type.

Social reform among the Catholics of Spain has likewise been somewhat belated. In some parts of the country unions of agricultural laborers and co-operative savings banks and pawnshops have existed for many years, but it is only since the beginning of the present century that the social movement became general. The statements of two bishops may be taken as typical of the present trend. In 1907 the bishop of Badajoz declared that the clergy "must ascertain the actual condition of society, study its necessities, and labor unceasingly not only with the poor but with the rich in Christianizing everybody and everything. . . . and undertake a vigorous campaign of Catholic social action." On the same occasion the bishop of Madrid said that the priests "must go to the people, and strive to introduce social and economic reforms." Many of the bishops point out the particular social works with which the clergy ought to co-operate, such as rural banks and labor associations.

The earliest and the greatest name in the Catholic social movement of England is Cardinal Manning. In his famous lecture on the 'Rights and Dignity of Labor,' in 1874, he denounced the policy of *laissez faire* and proclaimed the duty of the state to protect the rights of labor and to provide such industrial conditions as would assure the working classes decent family life. A few years later he declared in favor of an eight-hour day in the mining industry, Sunday rest, the limitation of profits and a legal minimum wage. His article in the *Dublin Review*, July 1891, discussing and interpreting Pope Leo's encyclical 'On the Condition of Labor,' is one of the best and most sympathetic expositions of that great document and did much to popularize it throughout the English-speaking world. Indeed, it is generally understood that the cardinal's views were sought and utilized in the preparation of the encyclical. The greatest single act of Cardinal Manning was his sympathetic and successful mediation in the famous dockers' strike in London in 1887. It is safe to say that no other Englishman of the 19th century was so generally revered and loved. Bishop Bagshawe of Nottingham and Mr. C. S. Devas were also important figures in the Catholic movement. The former took even a more advanced stand than Cardinal Manning in favor of the rights of labor, while the latter was an able author of works on political economy which were pioneers in their insistence upon ethical discussion as a necessary element in economic treatises.

For the last 10 years an organization known as the Catholic Social Guild has been engaged in founding study clubs and producing and circulating books and pamphlets that have exercised a very wide influence. The theories

and the legislative proposals set forth by the Guild are well thought out, pertinent and progressive.

The agitation for the reformation of the land tenure system of Ireland which was particularly active during the last quarter of the 19th century was to a great extent led and supported by the bishops and priests. The names of Archbishops Walsh and Croke, Bishop Nulty and many others will be readily recalled in this connection. If the peasant farmers of the Green Isle have obtained a tolerably satisfactory settlement of the land question they owe it at least as much to these spiritual leaders as to any other agency.

What work has been done for Catholic social reform in the United States has been carried on mainly by individuals. The relatively favorable condition of the laboring classes in this country and the preoccupation of Catholics both clerical and lay with the enormous task of building churches and schools have done much to postpone the organization of a social movement. Without doubt the most significant and far-reaching action of any individual Catholic in this field was performed by Cardinal Gibbons in 1888, when he obtained a revocation of the condemnation pronounced at Rome upon the Knights of Labor. In the memorial which he presented to the Roman authorities on this occasion he declared that labor organizations were necessary to protect the workers against the tyranny of an omnipotent capitalism and that the Church ought to take the side of humanity and of justice for the toiling masses.

A few years ago the American Federation of Catholic Societies established a Social Service Commission for the study of social questions and the promotion of social reform. This organization has endorsed the principle of a living wage and progressive labor legislation generally. The Central Verein, which is a federation of the German Catholic societies of the country, is doing important work through its publications, its annual courses of social study and its efforts on behalf of social and labor legislation.

The supremely important event in Catholic social reform was the publication of the encyclical 'On the Condition of Labor' ('Rerum Novarum') by Pope Leo XIII, 15 May 1891. In this document the Pope restated the traditional Catholic principles on social and industrial questions and applied them specifically and authoritatively to the conditions of the present time. The opening paragraphs emphasize the gravity of the social question and the urgent necessity of finding a solution, and include the statement that "a small number of rich men have been able to lay upon the teeming masses of the laboring poor a yoke little better than slavery." The principal declaration and proposals of the encyclical may be thus summarized: Socialism is unjust because it would prove injurious to all classes, especially the workingmen; employees should render an honest day's work; employers should treat their workers not as chattels but as human beings, should give them opportunity for religious and moral life, not taxing them with labor beyond their strength or unsuited to sex and age; the possessor of wealth may not use it as he pleases, but is morally bound to administer it for the benefit of the needy; the state is obliged to promote the welfare of all classes, but especially that of the wage earners, on account of their relative weakness, and should intervene whenever the general interest or any particular class "is threatened with mischief which can in no other way be met or prevented;" hence the state should enforce Sunday rest; limit the hours of labor and restrict the employment of women and children in conformity with their physical and moral welfare; the laborer has a natural right to a decent livelihood, and he is made the victim of force and injustice when he is compelled to accept a wage that is insufficient for reasonable and frugal comfort; the state should also promote a wide distribution of property among the laboring masses and foster labor unions, employers' associations and organizations embracing both employers and employees. Finally, the Holy Father exhorts every minister of religion to bring to bear upon the social question "the full energy of his mind, and all his power of endurance."

Twelve years later Pope Pius X reaffirmed and supplemented the principles of the great encyclical of his predecessor in an 'Apostolic Letter to the Bishops of Italy.'

Inasmuch as the encyclical of Pope Leo was addressed to all the peoples of the world, its propositions and proposals were necessarily stated in general terms. Nevertheless, they were sufficiently specific to meet the needs of every modern society and country. Were they honestly and thoroughly put into practice, they would remove all the serious social and industrial evils of the time.

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JOHN A. RYAN,
Professor of Moral Theology and Industrial Ethics, Catholic University.

CATHOLIC CHURCH AND SCIENCE, The. The development of the history of science in recent years has completely revolutionized our knowledge of the cultivation of science in the older time and with it many long accepted notions as regards the relation of the Church and science. Little was known about the history of science a generation or so ago even by scientists themselves and it was assumed that there was very little cultivation of science in the centuries preceding our own. It was felt that there must have been some active factor to account for the absence of scientific curiosity which is so natural to man that it would surely manifest itself unless definitely suppressed. The Church came to be looked upon as that factor and certain incidents in history were pointed out as indicating that her constant and consistent policy had been to hamper science lest it should disturb faith. Many refused to consider this a stigma on the Church,

because it was felt that some such attitude was absolutely necessary for the perpetuation of her sway over the minds of men. Science and faith being as they conceived incompatible, the Church had to take this determined stand of opposition, permitting only such scientific study as could not possibly be suppressed and encouraging only whatever could be directed into safe channels.

The recent development of the history of science has compelled another point of view entirely. The realization has been forced upon us that men have at all times been interested in science and concerned with its development. They have often followed it from different standpoints from those which now prevail, but they have seldom failed to be attracted by it or to make advance in it. The story of the mediæval universities is particularly striking in this regard. It has been the custom to say that there was no scientific interest in the Middle Ages, but as a matter of fact the mediæval universities were quite literally scientific. The Seven Liberal Arts as they were called, the *trivium* and *quadrivium* of the curriculum, astronomy, music and mathematics, logic, grammar, rhetoric, metaphysics, were all studied from the scientific standpoint. Huxley ("Inaugural Address," Aberdeen) said that the work of these old institutions of learning "however imperfect and faulty judged by modern lights it may have been, brought them face to face with all the leading aspects of the many sided mind of man." He even went so far as to add "I doubt if the curriculum of any modern university shows so clear and generous a comprehension of what is meant by culture as this old *trivium* and *quadrivium* does."

Geography.—This was the first of the sciences to develop and owes very large contributions to the early Christian missionaries who wandered far afield and wrote accounts of their travels. The Acts of the Apostles and Saint Paul's Epistles are valuable geographical documents. Saint Brendan's wanderings described by Dicuil the Irish geographer are further examples. Gerald the Welshman's writings are of geographic significance. A whole series of missionary writings down the centuries are now considered geographically very valuable. The stories of Friar John of Carpini and Friar William of Rubruk (Rubruquis) doing their missionary work in the Far East in the 13th century and of the Jesuits and Franciscans in the East and in America during subsequent centuries supplied immense amounts of geographic knowledge. The Jesuit "Relations" recently republished in some 70 volumes are a typical example of such storehouses of scientific data. Other missionary letters particularly those of the Recollects are of similar value. The work of Abbé Huc and of Père Armand David in the 19th century show that this good work still goes on. Abbé Huc succeeded in finding his way through Tibet and into Lhasa, two generations ago, while Père David wandered far beyond the territories familiar to Europeans in China and sent home accounts and even specimens of literally hundreds of species of animals hitherto unknown. Such scientific activity on the part of missionaries instead of being discouraged by the Church authorities was constantly encouraged. The typical demonstration of this is the favor enjoyed by Father Kircher, S.J., who coming to Rome just at the time of Galileo, continued for the next 30 years to be active in the accumulation of scientific information of all kinds so that he published under the patronage of the popes a long series of well-known volumes which have now become bibliographic treasures. Above all he founded the Kircherianum, as it came to be called, a museum containing many scientific materials which had been sent him by the missionaries of his own order, the Jesuits, or having been presented to the popes by other missionary orders were transferred here for safe keeping. Father Kircher was the personal friend of a number of popes who encouraged in every way his scientific work and particularly the growth of his museum.

Astronomy.—The great foundation stone of modern astronomy was laid by Copernicus. He was a Pole, who studied in Italy for some 10 years and then spent the rest of his life quietly as the canon of the Cathedral of Frauenberg, where, after making careful observations, he worked out his theory of the universe. He had already begun to think about it while he was in Italy and the Copernican theory was publicly taught in Rome long before Copernicus' great book was published. This work was dedicated with permission to Pope Paul III. Copernicus continued to be until the end of his life a staunch supporter of his friend and patron, Bishop Maurice Ferber of Ermland, who kept his see loyal to Rome at a time when the secularization of the Teutonic Order and the falling away of many bishops all round him made his position as a faithful son of the Church noteworthy in the history of that time and place. When Galileo insisted on stating Copernicanism as an absolute scientific doctrine instead of a theory, Copernicus' book was placed on the index (though not unconditionally, for its author is spoken of as "a noble astrologer" when the word astrologer meant astronomer) but only until certain passages in which theories were stated as facts should be modified so as to make their theoretic significance clear.

Before Copernicus a number of distinguished clergymen had attracted attention by their astronomical teaching. Bishop Vergilius, the Irish missionary astronomer of the 8th century, taught that the earth was round and freed himself from the charge that his teaching was contrary to scriptures. Albertus Magnus insisted that there were antipodes, taught the rotundity of the earth and other supposedly modern astronomical doctrines yet was always in high favor, was made a bishop, and after his death canonized as a saint. In the 15th century Cardinal Nicholas of Cusa taught that "the earth is a star as the other stars in the heaven." and that it had a movement of its own and could not be the centre of the universe. Though deeply interested in science and teaching many new and startling doctrines for his time he was made Bishop of Brixen, then Papal Legate to Germany for the reform of abuses, and finally a Cardinal, being a close friend of several popes. The first epoch-making astronomer of modern times was Regiomontanus, who established a regular observatory at Nuremberg. He was summoned to Rome to direct the calculations for the correction of the

calendar. His invitation to Rome for this purpose was within 10 years of the time when Pope Calixtus III is said to have issued a Bull against Halley's comet. The supposed Bull has never been found. Toscanelli who influenced Columbus so deeply was an intimate friend of Cardinal Nicholas of Cusa as well as of Regiomontanus and also of the famous Antoninus, Archbishop of Florence. Antoninus taught very emphatically that comets are celestial bodies like others in the heavens and had no effect on the physical or moral conditions of the world. Regiomontanus who was also a priest was a close friend of Toscanelli's. The relations between the ecclesiastical authorities and Toscanelli are illustrated by the gnomon which he arranged in the dome of the cathedral at Florence, by the shadow of which it is said that he could determine midday within half a second. Cardinal Ximenes of Spain improved this accuracy of determining noon by similar means so that the cordial ecclesiastical relations with science were not confined to Italy.

Toward the end of the 16th century Pope Gregory XIII, intent on the correction of the calendar, had an observatory erected in the Vatican Gardens for astronomical purposes, and here the meetings of the mathematicians and astronomers for the reform of the calendar were held. After this there was always a Roman Observatory directly under the patronage of the popes, either in the Vatican or the Roman College in charge of the Jesuits. When the Jesuits were suppressed or expelled by the Italian government the Vatican observatory was resumed as at the present time when it is under the charge of Father Hagan, S.J., who was for a time at the observatory at Georgetown University, D. C. The Jesuit astronomers, though the order was directly under the control of the Pope, taking a special vow of obedience to him, have done some excellent original work in astronomy. Nearly every important Jesuit College in the 17th and 18th centuries had an observatory, and secular students of astronomy made it a point to keep in touch with them. Professor Foster in *The Quarterly Journal of the German Astronomical Society* (1890, page 60) said, "Among the members of the Society of Jesus in the past and in the present we find so many excellent astronomers and in general so many investigators of purest scientific devotion that it is of important interest to their colleagues in science to notice them." The great names among them in astronomy are Father Clavius, to whom the Gregorian reform of the calendar is due; Father Scheiner, the authority on the sun and particularly on sun spots; Father Grimaldi, an authority on the moon, and Father Riccioli, who introduced the lunar nomenclature in use to-day. Three Jesuits, Fontaney, Noel and Richaud, are mentioned by Humboldt in his 'Kosmos' as early observers of double stars. In the modern time Father Secchi has been of deep influence on present day astronomy, and Fathers Perry, De Vico and Sidgreaves have done excellent work on government astronomical commissions.

The Church is supposed by many to have hampered the progress of astronomy, but that is all due to a misunderstanding of the Galileo case. Cardinal Newman once said that the Galileo case is the exception that proves the rule of beneficent patronage of science uniformly practised by the Church authorities. It is "the one stock argument to the contrary." Prof. Augustus de Morgan, in his article on "The Motion of the Earth" in the 'English Encyclopedia,' an authority not likely to be suspected of Catholic sympathies, has expressed exactly this same conclusion. "The Papal power," he says, "must upon the whole have been moderately used in matters of philosophy, if we may judge by the great stress laid on this one case of Galileo. It is the standing proof that an authority which has lasted a thousand years was all the time occupied in checking the progress of thought! There are certainly one or two other instances, but those who make most of the outcry do not know them." Professor Huxley, writing to St. George Mivart, 12 Nov. 1885, says that, after looking into the Galileo case while he was on the ground in Italy, he had arrived at the conclusion that "the Pope and the College of Cardinals had rather the best of it." In our own time M. Bertrand, the perpetual secretary of the French Academy of Sciences, declared that "the great lesson for those who would wish to oppose reason with violence was clearly to be read in Galileo's story, and the scandal of his condemnation was brought about without any profound sorrow to Galileo himself; and his long life, considered as a whole, must be looked upon as the most serene and enviable in the history of science."

As Father Secchi, S.J., pointed out: "None of the real proofs for the earth's rotation upon its axis were known at the time of Galileo, nor were there direct conclusive arguments for the earth's moving around the sun." Even Galileo himself confessed that he had no strict demonstration of his views. Lord Bacon refused to accept Copernicanism in Galileo's time and science was so far from determining the question of the truth or falsity of either the Ptolemaic or the Copernican system, that shortly before 1633, the year of Galileo's condemnation, a number of savants such as Fromond in Louvain, Morin in Paris, Berigario in Pisa, Bartolinus in Copenhagen and Scheiner in Rome wrote against Copernicanism. It was under these circumstances that Galileo was condemned for contumaciousness in teaching as positive science what was only theory, though he had given a solemn promise that he would not until further information was acquired. His punishment consisted in being placed in the custody of a Cardinal friend. He was never an hour in prison. His next custodian was another dear friend in Florence, and then eventually as a matter of form his son. The principal part of Galileo's punishment consisted in the recital of the Seven Penitential Psalms every day for three years. The expression *é pur se muove* "and yet it moves" was never uttered by him. It appears in history first a century after his death. The corresponding expression "the earth is a star like the other stars and moves in the heavens as they do" was used by Cardinal Nicholas of Cusa nearly two centuries before, but Cardinal Nicholas advanced the expression as a theory to be discussed and studied and not to be imposed as scientific, and so he continued to be looked up to as one of the great pillars of the Church.

Anatomy.— Anatomy after astronomy is the science oftenest said to have been hampered in its development by the Church because of the prohibition of dissection. As with regard to astronomy this is entirely a misunderstanding. The papal document which is not a bull, though often quoted as such, declared to forbid the cutting up of human bodies for anatomical purposes, only forbade their being cut up and boiled for transportation to long distances for burial. This was an abuse that had crept in during the Crusades. The records of public dissection in Italy begin just after the issuance of that papal decree. Dissection was done at Rome at all times and a number of papal physicians are famous for discoveries made as the result of dissection. Bealdo Colombo, the discoverer of the circulation of the blood in the lungs, Cæsalpinus the first to describe the circulation of the blood in the body, Eustachius after whom the tube is named, Varolius of the Pons Varolii in the brain, Malpighi, after whom more structures in the human body are named than any other and deservedly because he was their discoverer, and Lancisi, the great anatomical teacher, were all papal physicians. Bodies were supplied freely for dissecting purposes in Italy during the later Middle Ages and the Renaissance, directly under the influence of the Church. All the great artists of the Renaissance period made many dissections. Whenever anyone anywhere in Europe before the 19th century wanted to have special opportunities for anatomical study he went down to Italy. The case of Vesalius the Belgian who, unable to secure dissecting material in the early 16th century at Louvain or Paris, went down to Italy, where he wrote his great textbook of anatomy illustrated by dissections, which is still a classic exemplifies this very well. Stensen the Dane after having studied for a while in the Netherlands also went down to Italy to complete his studies and there became a Catholic and later a priest and even a bishop. In the meantime, however, he had been a professor of anatomy at Copenhagen. The prejudice against dissection is Puritanic and modern and reached its height in the late 18th century. In nearly every city in the United States, in the early 19th century, mobs attacked dissecting rooms, destroyed property and even put the lives of physicians and medical students in serious danger. It is only by recent legislation that English and American physicians have succeeded in securing the privilege of dissection and the material for that purpose as freely as they had it in Italy in the later Middle Ages.

Surgery.— President White suggested that the reason why surgery was neglected in the Middle Ages and the ignorant barber surgeon the only resource of afflicted humanity suffering from surgical disease was that the Church had forbidden clergymen to practise surgery because it was not proper for them to shed blood, and as the only educated people of the time were clerics, hence surgery fell into the unworthy hands of the barber surgeons. Recent developments in the history of surgery contradict this idea completely. Really great surgery began to develop at the University of Salerno before the end of the 12th century. The surgical textbooks of Roger and Roland and of the Four Masters were written down there and then surgical development continued in North Italy. These wonderful Italian surgeons of the later Middle Ages anticipated most of our modern surgery. We have their textbooks which were fortunately printed in the Renaissance time and have now been reprinted in modern editions. They were operating on the skull for tumor and for abscess, on the thorax for pus and other fluids and on the abdomen for many conditions. They insisted on sewing up intestines when wounded or the patient would surely die. They used various devices, tubes of metal, of bone, and the trachea of animals to help them in these intestinal anastomosis operations and seem to have gotten very good results. They could not have done such extensive operations without anæsthesia, but we know now that for two centuries all important operations were done under an anæsthetic and we know the mode and means by which they produced anæsthesia. Their death rate would have been very high without antisepsis, but they employed strong wine as a dressing, insisted on utter cleanliness and got union by first intention,— the very expression is mediæval Latin — and were proud of their "pretty linear cicatrices."

So far from there being any Church opposition to the development of surgery one of the greatest of these surgeons of the 13th century, Theodoric, who left an important textbook which has attracted a great deal of attention in our time, was actually a bishop. He deprecated strongly the idea that the development of pus was necessary in the healing of wounds; he discusses fracture of the skull and of the vertebræ quite thoroughly, gives rather elaborate directions for intestinal anastomosis over a metal tube; insisted that abdominal wounds should be closed and not left open and deprecated the use of the probe and of manipulations in fractures of the skull, in compound fractures or in wounds of the abdomen. Theodoric was made a special confessor (penitentiarius) by Pope Innocent IV and later was made a canon and then a bishop. He had a lucrative practice in surgery but left the money he made for charity. So far from surgery being neglected in the Middle Ages this is one of the most important periods in its history. Among the great Italian surgeons are William of Salicet and Lanfranc, who afterward taught at Paris, and Guy de Chauliac who is usually spoken of as the Father of French surgery. Chauliac studied in Italy and became the papal physician of the popes at Avignon, where he wrote his 'Chirurgia Magna,' a great textbook in which many supposedly modern developments of surgery are anticipated. Chauliac was a cleric, probably a priest, a great personal friend of the Avignon popes, one of the most respected men of his own time and high in the estimation of modern historians of surgery. He declared that a surgeon who did not know anatomy was like a blind carpenter sawing wood. Chauliac told of his own studies in anatomy in Italy and his expressions demonstrate that there was not the slightest opposition to dissection or anatomical study by the ecclesiastics. The great Italian and French surgeons of the later Middle Ages worked out the laws for the proper administration of mercury, which is one of the greatest triumphs in the history of therapeutics.

Chemistry.— Some historians have suggested that a Papal bull of the later Middle Ages forbade alchemy and therefore hampered the development of chemistry just as the similarly quoted Papal bull, which we have seen had no such import, forbade dissection and therefore prevented the proper evolution of anatomy. The bull as to chemistry referred to is one issued by Pope John XXII, and its text, as also the text of the corresponding decree with regard to the cutting up of bodies, may be found in 'The Popes and Science' (Walsh, New York 1915). The "alchemies" that were forbidden under this technical term were operations for the supposed manufacture of gold and silver out of base metals. As pointed out by the Pope these were bringing about debasement of the coinage and so were very properly prohibited. The popes of the time issued bulls for the chartering of universities and the regulation of education generally and this being an international matter very naturally came within their purview. There is not the slightest evidence for any Church opposition to chemistry at this time or subsequently. There had been a good deal of interest in chemistry during the 13th century and Albertus Magnus and Roger Bacon made distinct contributions to the science under the name of alchemy, Raymond Lully wrote on it some 16 treatises, Arnold of Villanova gave special attention to it and the Hollanduses, father and son, continued it in the 14th century. Albertus Magnus was highly honored in his own time, was made a bishop and subsequently was canonized. That is his life was held up as a model of what a Christian should be. Roger Bacon is sometimes said to have been persecuted for his work in science and particularly in chemistry, but not by those who know his life. Bacon was placed under custody — there is no evidence for imprisonment — because of the violation of disciplinary regulations within his own order, the Franciscans, but it was due to the request of a pope that his great works on science were written and Roger Bacon himself never withdrew from the Franciscans, but continued to be a member of the order until his death, well past 80 years of age.

There was abundant interest in chemistry in the 16th century, and it is curious how many of the men connected with it were ecclesiastics. Basil Valentine, the German Benedictine Monk, may be only a name for a group of men, but the writers were surely Benedictines. Paracelsus, the great chemical investigator for medical purposes of the 16th century, mentions that he was helped in his chemical studies by the Abbot Trithemius of Spanheim; by Bishop Scheit of Stettbach; by Bishop Erhardt of Lavanthol; by Bishop Nicholas of Hippon; and by Bishop Matthew Schacht. In more modern times there has been no question of any opposition to chemistry, and pharmaceutical chemistry at least has had some magnificent contributions made to it by the drugs obtained from the Indians by missionaries. These include *cinchona*, which was for so long known as "Jesuits' bark"; *cascara sagrada*, secured by the Franciscans from the American Indians; a number of valuable laxatives from the same source, *grindelia robusta* and other pharmacals.

Medicine.— It has been suggested that the Church was so much interested in cures by relics, prayers, masses, pilgrimages to holy places, and the like, that naturally her policy was to discourage the development of medical science. The historical contradiction of this suggestion is to be found in the list of papal physicians. The popes summoned to Rome to be their personal medical attendants and as a rule at the same time to teach in the Papal Medical School at Rome some of the most distinguished scientific physicians of medical history. No list of physicians connected by any bond in the history of medicine, not even that of the faculties of the older medical schools, can compare in personal prestige and scientific achievements with the roll of papal physicians. In the section of this article on anatomy a few of them are named, but there are literally dozens of others who have an enduring place in the history of medicine. Among them are Guy of Montpellier, a great reorganizer of hospitals; Richard, the Englishman, famous throughout Europe in his time; Taddeo Alderotti and Simon of Genoa, both well known in medical history; William of Brescia; Gentilis; John Philip de Lignamine, bibliophile and hygienist; Bartholomew of Pisa; Paulus Jovius; Brasavola; Alfonso Ferri, the authority on gun-shot wounds; Manovelli; John of Aquila, referred to by his contemporaries as "a second Æsculapius"; Frigimelica, famous for his study of baths; Maggi, who made the study of gun-shot wounds so clear; Cananus, the well-known dissector; Simon Pasqua, who wrote on the gout; Gymnasius, who was summoned on consultation to many of the princes of Italy; Malpighi; Cæsalpinus; Jacobus Bonaventura; the brothers Castellani; uncle and nephew Sylvester and Taddeus Collicola; Zacchias who wrote on medico-legal problems, and so on through many other names that have a place in the history of medicine.

The Church's attitude toward medicine is very well illustrated by the regulations for the maintenance of high standards in medical education which were enforced by papal bulls. According to these there had to be three years of preliminary study at the university, then four years at medicine and a year of practice with a physician before personal practice could be taken up. We have climbed back in many schools, but by no means in all, to this standard in the 20th century. In the mid-19th century we required only two terms of four months each, ungraded lectures, for the degree in medicine, and that was a license to practise in any State in the Union.

The Church's greatest contribution to medicine was the hospitals. Mediæval hospitals were beautiful buildings, well planned, roomy, airy, with an abundance of water and well-organized nursing. Virchow has told the story of these old hospitals and their foundation. The main factor was "the papal enthusiasm." He adds: "Though hospitals had existed in the East it was reserved for the Roman Catholic Church . . . to establish institutions for the care of those suffering from disease." Miss Nutting and Miss Dock in their 'History of Nursing' have emphasized the contrast between the sordid municipal and State institutions of the modern time with the "beautiful gardens, roomy halls and springs of

water of the old cloister hospitals of the Middle Ages with the comforts of their friendly interiors." It was these finely organized hospitals and the good nursing that made the astounding surgery of the later Middle Ages possible. The three things go together,— good surgery, good nursing, good hospitals. The mediæval hospitals were very numerous. Virchow points out that in Germany every city of 5,000 inhabitants had its hospitals. They were at least as numerous in the Latin countries.

An old proverb ran "where there are three physicians there are two atheists." This is not true so far as Catholic physicians are concerned and especially not as regards great scientific physicians. The illustrations will serve to show at the same time the relations of the Church and medicine in the last two centuries. Morganig "the father of modern pathology" (Virchow), was a devout Catholic, one of whose sons became a Jesuit and all of his eight daughters nuns, with their father's full approbation. Laennec, the greatest of clinical physicians, was a devout Breton Catholic whose favorite devotion was the Rosary. Auenbrugger, the inventor of auscultation, Corrigan, of Corrigan's disease, Schwann, the founder of the cell doctrine, Johannes Müller, the father of modern German medicine, Claude Bernard and Pasteur, were not merely nominal, but thoroughly practical, Catholics. The same thing can be said of such men here in America as Sir William Hingston of Montreal, Prof. Thomas Dwight, Parkman professor of anatomy at Harvard for 25 years, Thomas Addis Emmet, pioneer in American gynæcology, Horatio Storer, a leader in the organization of hospital nursing and the reform of hospitals, John B. Murphy, our greatest surgeon in this generation, and many others who might be mentioned.

Biology.— The biological sciences are usually supposed to have been the focus of the danger area for faith in modern times, and especially since the theory of evolution has gained ground the Church presumedly had to take an attitude of opposition. As a matter of fact many of the epoch-making workers in biology have been devout ecclesiastics. Experimental and observational biology begins with Abbé Spallanzani (1729–99), whose work 'Regeneration' (1770) opened our era. The discoverer of the cell theory was Theodor Schwann, a Catholic from the Rhineland, who refused flattering offers of professorships in German universities because he wished to remain among his Catholic students in Belgium. Johannes Müller, the great German physiologist, to whom modern biology owes more than to any others, was a devout Catholic. So was Pasteur, the father of modern bacteriology. Claude Bernard, like many Frenchmen, neglected religion in mid-life, but for some years before his death was a faithful Catholic. Mendel, the revolutionizer of modern biology in all that relates to heredity, was an Augustinian monk, who, in the midst of his scientific work, was elected the abbot of his monastery and died in the odor of sanctity. Father Armand David, the missionary in China, probably described more hitherto unknown species of animals and plants than any other in the last generation.

One of the greatest of modern entomologists is Father Wasmann, S.J. In archæology Catholic churchmen have rendered brilliant service: Abbé Breuil and Father Obermaier are the greatest living authorities on the cave man. The greatest name in Babylonian archæology is Père Scheil, the Dominican, who so promptly translated the Code of Hammurèabi and has done so much else to put archæology in his debt. Far from the Church discouraging such scientific work by priests they are given opportunities for it, can readily command the aid of other ecclesiastics and, above all, are free from solicitude as to worldly cares while carrying it on. The hierarchy and the religious orders to which they belong take pains to show them how proud they are of their achievements, and they themselves, far from having their faith disturbed by their science, are usually known for their devotion to their religious duties. As it is now it has always been. At times there have been unfortunate misunderstandings. These occur also at the present time. They are entirely personal. They do not represent the policy of the Church. Occasionally it seems as though a scientist is being hampered in his work by religious superiors, but thorough knowledge of the case always shows other factors at work.

Physical Science.— The policy of the Church as to the physical sciences, apart from those mentioned, is clear from history. Many of the distinguished names in the scientific development of electricity from Father Diwisch, Franklin's rival in bringing lightning from the clouds, and Father Beccaria, who, through Priestley's influence, was elected Fellow of the Royal Society of England, and Abbé Nollet, famous for his series of experiments on the effects of electricity on animals and plants, were Catholic priests. A great many of the distinguished pioneers in electricity were faithful Catholics. To take only the names of the men after whom units in electricity are named we have Galvani, who asked to be buried in the Third Order of Saint Francis, to which he belonged; Volta and Ampère, both of them well known for their devout faith and practice; Coulomb, a good French Catholic, and Ohm, who was teaching at a Jesuit school when he made his great discovery of the law of resistance. Meteorology, in the older time as well as now, and seismology in recent years, owe much of their development to the scientific stations established by the religious orders, especially the Jesuits in connection with their colleges in various parts of the world. These brought precious information from which laws were deduced. The Jesuits solved the secret of the severe storms of the Philippines and the United States government recognized their work.

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JAMES J. WALSH,
Author of "The Catholic Churchmen in Science"; "The Popes and Sciences," etc.

CATHOLIC CHURCH IN THE UNITED STATES, The. Recent historical developments as to the Norsemen on the American Continent show that there was a bishop in Greenland and missions on the mainland before the end of the Middle Ages. Whether any of these were in territory now the United States is not sure, but the traditions of Norumbega (q.v.) favor it. The first definite date in United States Catholic History is that of the celebration of mass on Manhattan Island for the expedition of Verazzano, who led French ships here in 1524. The Spanish settlement (1565) of Saint Augustine, Fla., was the first Catholic foundation in the country. The French settlement of Louisiana led to a distinct development of Catholicity in that region in the 17th century. The Indian missionaries, who in the same century came down from Canada into what is now Maine, New York, Michigan and Illinois, represented further developments of early Catholicity here. The Spanish missionaries on the Pacific Coast in the 18th century showed how much could be accomplished by such efforts among the Indians when unhampered by the exploitation of the whites. As the result of the Franciscan missions the Californian Indians, some of the lowest in the country, were in the course of a single generation lifted to a comparatively high level of civilization, living peacefully in their mission towns, occupying themselves with agriculture and domestic manufactures, but above all developing what amounted almost to genius in the arts and crafts and leaving monuments of architecture that are standing witnesses, now fortunately being carefully preserved, of the success of their Christian teachers to bring out all that was best in Indian nature.

As a rule, in the 13 original colonies, Catholics were proscribed. Even in Maryland, founded by a Catholic and whose proprietor, Lord Baltimore, had at its foundation proclaimed for the first time in history the practice of religious freedom, proscriptive laws were passed after a time and Catholics were deprived of most of the rights of citizens. In New York under King James II a Catholic governor of the colony, Thomas Dongan, granted a charter (1683) far more liberal than that enjoyed by any American colony up to that time, above all securing for everyone absolute freedom of worship; but after the fall of the Stuarts, Catholics in New York came under rather severe laws once more, so that as late as the middle of the 18th century John Ury, convicted of being a Catholic priest, though he was not, was put to death.

Pennsylvania was the only one of the colonies that tolerated freedom of worship for Catholics before the Revolution, for even Maryland, founded by Catholics on the principle of religious tolerance, had so turned against that original liberal policy that when there was question of building a Catholic church in Philadelphia the project was for a time put off until there was a definite settlement of the dispute then pending, as to whether the land on which Philadelphia was built belonged to Maryland or Pennsylvania.

In spite of this intolerance of the colonists a great many of the Catholics fought bravely for the colonies in the Revolution, so that Washington particularly came to respect them thoroughly. Some, like General Moylan, became close friends, while the ardent patriotism of men like Commodore Barry heartened the Father of his Country at some of the darkest hours of the Revolution. Catholic toleration in Pennsylvania had its manifest good effect, a large proportion of the famous fighting Pennsylvania Line,—"the Line of Ireland," as General Lee called it,—were Catholics. When Guy Fawkes' Day was to be celebrated in Boston with the burning of an effigy of the Pope, Washington wrote a letter, still extant, suggesting how unsuitable was such a celebration when Catholics were taking their parts whole heartedly with the colonists. One of the important signers of the Declaration of Independence was Charles Carroll, a Catholic, who, when someone remarked that there were so many Carrolls that the British would not know exactly which one it was, designated himself beyond all doubt by adding "of Carrollton." Even John Jay's bigotry, though it alienated Canada, did not lessen the patriotism of Catholics in the colonies. The alliance with His Most Catholic Majesty of France did much to break down intolerance toward Catholics and the further alliance with Catholic Spain helped the same good cause. Members of Congress from all over the country came to be on terms of intimacy with the French and Spanish Ministers who had Catholic chaplains with them and formal religious celebrations of successes in the Revolution were held in Saint Joseph's Church, Philadelphia, and attended by many prominent in the government of the country. All this helped to break down bigotry. The Chevalier de la Luzerne, the French Minister, who pledged his private fortune to the help of the colonists, was a further important factor in the lessening of prejudice. He won the respect and friendship particularly of New England members of the Continental Congress and became a close personal friend of Governor Trumbull of Connecticut, the "Brother Jonathan," whose name became the popular symbol of our people until replaced by "Uncle Sam." Benedict Arnold's treason plot proposed besides the surrender of West Point a scheme to capture the French Minister on one of his visits to Connecticut. Among the excuses alleged by Arnold in extenuation of his treason was that the Quebec Act had granted freedom of worship to Catholics in Canada and the toleration of Catholicity which he saw growing in the Colonies endangered the Protestant religion. It has sometimes been said that the securing of toleration in this country was more of an accident than a definite purpose. Anglican and Puritan could not trust each other, so Catholics slipped in under the general religious liberty which had to be voted. As a matter of fact it seems clear now that the first amendment to the constitution, guaranteeing religious liberty, was not a little due to Washington's influence and was

carried because he wanted to safeguard the rights of the Catholics, whom he had learned to value highly for their heroic efforts for the country during the Revolution. In spite of this amendment, however, the laws of many States continued to bar Catholic citizens from their rights. Pennsylvania and Delaware were the only States whose laws did not need expunging in order to secure to Catholics the right to vote and be voted for. In 1784 Rhode Island removed from its constitution the clause disqualifying Roman Catholics from office. This was before the adoption of the Federal Constitution, but other States were slow to follow this example. In 1806 New York did so, but Massachusetts waited until 1821, Virginia until 1830, North Carolina until 1836, New Jersey did not remove all disqualifications from Roman Catholics until 1844, while in 1876, fully 100 years after the adoption of the First Amendment to the Federal Constitution, New Hampshire still retained disqualifying laws, only repealed the following year. Shortly after the Revolution the Church was organized independently of all foreign influence with John Carroll, a relative of the signer, as Prefect Apostolic, appointed 26 Nov. 1784. Until the Revolution the Catholics in the colonies had been under the jurisdiction of Bishop Challoner, the Vicar Apostolic of London. His successor refused to exercise any jurisdiction. It was proposed at first that the Church should be under French ecclesiastical jurisdiction and Franklin as our Minister to France favored this for a time, but was brought to realize the danger there would be in such foreign influence. Rev. Dr. John Carroll's appointment followed his recognition of this.

In his letter of acceptance Rev. Dr. Carroll states that there were at this time in Maryland 15,800 Catholics; in Pennsylvania 7,000; in Virginia 200; in New York 1,500; a few in New England and some scattered along the Mississippi, formerly under the jurisdiction of the bishop of Quebec. Altogether there were less than 30,000 Catholics in the whole country. The infant Church had some serious troubles, many of them due to what is known as the trustee system. Laymen in control of the funds thought to control also sacerdotal and even episcopal action. The spirit of independence in the new country readily tempted to abuses in this matter and the first half century of Catholic history has many such disputes, which led to the loss by the Church of a number of Catholics, especially of the older families. In 1789, the year of the organization of the government, Dr. Carroll was made bishop, so that the State and the Catholic Church run parallel in their formal history. Bishop Carroll at once took up the project of a college, already discussed in 1786, and Georgetown College in the District of Columbia was founded in 1789. Bishop Carroll visited Boston and notes with pleasure how the spirit of tolerance is growing. "It is wonderful to tell what great civilities have been done to me in this town where a few years ago the popish priest was thought to be the greatest monster in creation." Previous intolerance can be best understood from the fewness of the Catholic population in New England, for in 1798 the whole number of Catholics was estimated at only 750, this figure including some 500 Catholic Indians in Maine. In 1800 Rev. Dr. Matignon erected the first building for Catholic services in Boston worthy of the name of a church, "John Adams, President of the United States, and other Protestant gentlemen being generous contributors." In 1803 the Louisiana Purchase brought New Orleans into the United States, in which there had been a bishop since 1793, and with a large increase in Catholic population. The religious liberty assured in the country soon brought large numbers of Catholics and led a great many back to the faith which either they or their fathers had abandoned because of religious intolerance and the difficulty of practising their religion. At Bishop Carroll's suggestion new bishoprics were created in 1808 in Boston, Philadelphia and Bardstown. He recommended that New York be left under the jurisdiction of Boston, but the Irish bishops succeeded in securing the appointment of Father Luke Concanen as bishop of New York. Bishop Concanen died before reaching this country. Dr. Egan was chosen bishop of Philadelphia, Dr. De Cheverus bishop of Boston and Dr. Flaget of Bardstown. Baltimore then became an archbishopric. Archbishop Carroll died in December 1815 and was succeeded by Archbishop Neale, who established the Visitation Convent at Georgetown, D. C., and restored the Society of Jesus, suppressed by the Pope in 1773, but now permitted to revive. Prince Gallitzin of Russia, who had become a priest, did splendid missionary work in western Pennsylvania in the early part of the 19th century, founding in 1799 the town of Loretto, still famous as a Catholic centre.

The American Church was particularly fortunate in the bishops who occupied these first sees. Archbishop Carroll was a valued and respected friend of the patriots who made the country. Bishop Louis de Cheverus, the first bishop of Boston, had been doing heroic missionary work throughout New England for more than a quarter of a century before he was made bishop. He was often consulted by the legislature of Massachusetts and accepted many invitations to explain Catholic doctrine, making use for this purpose even of Protestant churches. Speaking of him, William Ellery Channing said: "How can we shut our hearts against this proof of the Catholic religion to form good and great men?" Bishop Flaget, another Frenchman, the first bishop of Bardstown, was indefatigable in his missionary labors in the immense territory under his jurisdiction, now divided into 28 dioceses, five of them archdioceses. He won the respect and reverence of all who came in contact with him. The Bardstown bishopric was subsequently transferred to Louisville (1841). Bishop Rosati, an Italian, the first bishop of Saint Louis, was another one of these marvelous pioneer bishops whose missionary spirit could not be satisfied. In one year his converts numbered 300. Bishop Loras became the first bishop of Dubuque in 1837 with but one priest to help him, and yet he succeeded in accomplishing immense good and stamping his personality on all the future history of Dubuque. Another very successful French bishop was Joseph Cretin, the first bishop of Saint Paul. Some of the problems he had to meet will be understood from the fact that within a period of six years his flock grew from 1,000 to 60,000. Like

Bishop Loras of Dubuque he was very successful in promoting Catholic immigration and laying deep foundations for the future of his diocese. The bishops were of all nationalities and Frederick Baraga, a Slovenian from the west of Austria, was appointed the first bishop of Marquette in 1853 after having labored for 22 years as a missionary among the Indians of Michigan. His writings are still recognized as of high authority on the languages of the American Indians.

The Church continued to grow rapidly, particularly in the South and West, and two new bishoprics were created in 1820 in Richmond and Charleston. Rev. John England of Irish birth, destined to be a great power in the American Church, was made bishop of Charleston. His writings are still a storehouse of information on Catholic subjects. The bishoprics of Cincinnati and Saint Louis were erected in 1821 and 1826. It was felt that the growth of the Church now demanded that the bishops and prominent ecclesiastics of the country should take council of each other for the benefit of Catholicity in America, and the first Provincial Council of Baltimore was held in 1829. The records show that at this time Catholics had increased more than 12 times in numbers in this country and that there was in 1830 a Catholic population here of nearly 400,000.

New bishoprics continued to be founded in the West and sees were erected at Dubuque in 1837, Chicago and Milwaukee in 1843, Oregon City 1846, Saint Paul and Santa Fé 1850 and San Francisco in 1853. Before the acquisition of California San Francisco had been part of the Mexican diocese of the two Californias erected in 1840. During the decade after 1840 Catholicity increased very rapidly in the United States because of European immigration. The famine in Ireland and political troubles of various kinds in other countries caused a great many immigrants to seek the protection of the United States and the Church had to make provision for a very large increase in its membership. To deal with the new problem thus created the First Plenary Council of Baltimore assembled in 1852. At this time the Catholic population numbered about 2,000,000; there were 30 episcopal sees including the six archdioceses ot Baltimore, New Orleans, New York, Cincinnati, Saint Louis and Oregon City. In New York and Boston particularly Catholics increased rapidly in numbers. At the end of the first quarter of the 19th century there were some 15,000 Catholics in the diocese of Boston, about half of whom were in the city, but they were beginning to crowd into all the growing towns of New England, Lowell, Newport, Fall River, Taunton, Providence, Hartford. New York grew even faster. At the end of the first decade of the 19th century Father Kohlman, S. J., found the parish of Saint Peter's in New York city to contain 14,000 Catholics. He purchased a site for a second church between Broadway and Bowery road, then on the outskirts, and with the coming of a bishop to New York this became the cathedral. Father Kohlman who opened a school and was prominent in the intellectual life of the city was once summoned as a witness against prisoners accused of thievery and asked to tell what he had heard from them in confession. This he refused to do in a most solemn way in court and the presiding justice, De Witt Clinton, supported him, thus settling for America the question of the status of information obtained in confession as privileged. The second bishop of New York was John Connolly, consecrated in 1814. He was succeeded by John Dubois in 1826. At his arrival he estimated the Catholics in the city at 25,000 and throughout the diocese 150,000. To serve the spiritual needs of this immense number New York city had but six priests and there were but four in the rest of the State. Albany, Rochester and Buffalo though each containing hundreds of Catholics had no resident priests. Brooklyn had but one small chapel, a mission from New York, visited occasionally by a priest. Newark, Paterson and New Brunswick, all of them then in the New York diocese, were only building their small churches. Almost necessarily under such difficult conditions a great many Catholics lost their faith because of lack of opportunities to practise their religion and bring up their children in it. Some of the Western dioceses were of course in even worse straits. Bardstown included besides Kentucky and Tennessee all the country known as the Northwest Territory, embracing what is now the States of Illinois, Indiana, Michigan, Wisconsin and Ohio. There were small scattered Catholic communities of French at Kaskaskia, Kahokia, Prairie du Rocher in Illinois; Vincennes, Ind., along the Raisin River and in Detroit and Mackinaw, Mich., at Sandusky, Ohio, and Green Bay, Wis., though there were only three priests to tend to them all. Bishop Flaget within 10 years was able to report that he had in Kentucky alone 19 churches, 10 priests and 10,000 Catholics.

Some of the pioneer priests were remarkable men. One of these was Father Gabriel Richard, a Sulpician who did so much for Detroit and the neighborhood at the beginning of the 19th century. The Sulpicians, exiled from Paris by the Revolution, were of great help to infant Catholicity in America. They founded Saint Mary's Seminary in Baltimore (1791) which, after a very trying time at first, proved a wonderful nursery of priests for the American Church. In 1831 they founded Saint Charles College for clerical students though it was practically not opened until 1848. Father Richard was assigned to the missions in Illinois about 1795, transferred to Detroit in 1798. He opened a young ladies' academy in 1804 and a seminary for young men the same year. The girls were taught spinning and weaving as well as purely intellectual subjects. With Rev. John Monteith, pastor of the Protestant church of Detroit as president and Father Richard as vice-president, the "Catholepistemiad or University of Michigan" was founded in 1817. In 1821 when the University of Michigan was incorporated Father Richard was made a trustee. He published the first Catholic paper in this country, *The Michigan Essay or Impartial Observer.* Before he was able to get the printing press over the mountains he had a public crier who as a "spoken newspaper" gave the news and certain advertisements at the church door on Sundays. In 1823 he was sent to Washington as territorial delegate, the only instance of a priest having a seat in Congress. When cholera visited Detroit in 1832 he fell a victim to the disease in his zeal for the sick. Judge Cooley declared "he would have been a

man of mark in almost any community and at any time."

One of the greatest of the Catholic prelates of the United States was John Hughes (1797–1864) who became bishop of New York in 1838 and the first archbishop of that see in 1850. A self-made man who worked his way through Mount Saint Mary's College, Emmittsburg, Md., as a gardener, he demonstrated a high quality of intellect in his controversy with Rev. John Breckenridge which made the American people realize for the first time how strong was the intellectual position of the Catholic Church. He showed his firm character during the troublous times of trusteeism in Philadelphia and then was made bishop of New York. He at once took up the correction of abuses that had crept into New York life to the detriment of the Church. It was due to his efforts that the Public School Society, a private corporation which controlled the funds and managed the common schools of New York, was dissolved, to the lasting benefit of popular education. Bishop Hughes then inaugurated a system of parochial schools which has developed into the magnificent Catholic school system of New York. His controversy with "Kirwan" (Rev. Nicholas Murray) in 1850 probably did more than anything else to make Americans understand how utterly one-sided were the commonly accepted views of the Church in this country. The firm stand that Bishop Hughes took in New York prevented the rioting, destruction and bloodshed, which occurred as a consequence of Native Americanism in 1844 in Philadelphia, and of Know Nothingism 10 years later, in many parts of the country, from coming to a head in his diocese.

He was well known for his thorough-going devotion to the best interests of his adopted country, and was a personal friend of President Polk and of many men prominent in the political history of the time. During the Civil War he was appealed to by President Lincoln and Secretary of State Seward and was entrusted with a diplomatic mission of an informal character to Europe and particularly to France in order to neutralize the growing sentiment in favor of European intervention on the side of the South. In spite of failing health which had compelled him to ask for a coadjutor he accepted this mission at the personal solicitation of President Lincoln, had an interview with the Emperor Napoleon in December 1861 and then proceeded to Rome, where, during many months, he met prelates from European countries and corrected many false impressions with regard to the war between the States. The government at Washington felt that his visit to Europe had been of great importance in making the cause of the North better understood and an official intimation of this was conveyed to the Holy See direct from President Lincoln, suggesting that the Archbishop could only be properly rewarded by Rome, but his failing health put that out of the question. President Lincoln wrote a letter commending Archbishop Hughes' patriotism. The last public function that he undertook was a public address delivered shortly before his death to the Catholics of New York with regard to participation in the "draft riots," which caused so much disturbance to the city and country in July 1863. His address to the crowd had to be made sitting down because of his weakness and his voice could not be heard far, but his published words made it clear beyond all doubt that the Catholic Church commended to its members their duties as citizens to fight for the conservation of the Union to which they owed so much.

Just before and after the middle of the 19th century the Catholic Church received great additions to its members by the immigration from Ireland, consequent upon the famine and intolerable conditions there, and from Germany because of political disturbances in connection with the revolutions of 1848. Undoubtedly the strongest American influence exerted over these newly-arrived Americans was that of the Church, and its effect was seen in the large numbers of Catholics of Irish and German descent who fought splendidly and so many of whom shed their blood in defense of the Union during the Civil War. There had been organized intolerance under the name of the Native American party, which led to the burning of the Ursuline Convent at Charlestown, Mass., in 1834, and of two Catholic churches in Philadelphia (1844) as the result of riots in which a number of people were killed. In the fifties the Know Nothings, so called because of their answer to all questions about the organization as directed by its rules was "I know nothing," led to serious disturbances, including the killing of Catholics, the burning of churches and other outrages in some 10 States. The answer to this campaign of bigotry by the patriotism displayed in the Civil War was complete.

About the same time the Church began to make large gains by conversion from among the educated people of the country. There was an "Oxford Movement" in America as well as in England and many distinguished converts were made. Among these the best known was Orestes Brownson, well known as a writer on serious subjects, and Isaac Hecker (of Brook Farm), who gathered round him the group of men who founded the Paulist Congregation, New York, for the conversion of non-Catholics. There were a number of converts from among the Protestant clergy, the most distinguished of them being Rev. Dr. Levi Silliman Ives, the Protestant Episcopal bishop of North Carolina, Rev. Dr. Preston of New York, Rev. James Roosevelt Bayley of New Jersey, Rev. George Herbert Doane, the son and brother of Protestant Episcopal bishops of New Jersey and Albany, and somewhat later, Rev. Kent Stone, president of Kenyon and Hobart colleges, who afterward became Father Fidelis of the Passionists.

The best proof of the recognition by Church authorities that the Church in the United States should be absolutely American in character and in sympathy with the republican aims of this country is to be found in the fact that a number of these converts were advanced to the highest posts in the hierarchy. James Roosevelt Bayley became bishop of Newark and later archbishop of Baltimore and is said to have been offered the cardinalate which he declined in favor of Archbishop McCloskey of New York. Other converts who became bishops were Tyler of Hartford, Wadhams of Ogdensburg and Wood of Philadelphia, who later became archbishop. Father Doane became vicar-general

and chancellor of the diocese of Newark and Father Preston became vicar-general of New York and both were made domestic prelates of the Pope. Dr. Silliman Ives was founder and the first president of the "Catholic Protectory for Wayward Girls and Boys of New York" and was given as a layman distinguished opportunities for the accomplishment of great good. Many other distinguished converts were made, among them Dr. J. V. Huntington, brother of Daniel Huntington, the artist, who wrote a series of Catholic novels; George Parsons Lathrop and Charles Warren Stoddard, poets; Edward Lee Greene, the botanist, Rev. Daniel Hudson of the *Ave Maria,* Molly Elliott Seawell and Frank Spearman, novelists; Rose Hawthorne, the daughter of Nathaniel, who afterward became Mother Alphonsa of the Cancer Home; Mr. and Mrs. Bellamy Storer and such distinguished physicians as Drs. Van Buren, one of the leaders of the profession of New York city, Horner, professor of anatomy at the University of Pennsylvania, Dwight, Parkman professor of anatomy at Harvard University for 25 years, Thomas Addis Emmet, of international fame in his specialty of women's diseases, Horatio Storer, vice-president of the American Medical Association and well known for his contributions to American medical literature. The number of conversions grew each year after the middle of the 19th century, increasing particularly in recent years, until it is calculated that about 25,000 converts are received annually into the Church at the present time. Perhaps the best evidence that the Church appeals to thoroughly practical men as well as to those of spiritual and intellectual tendencies is to be found in the fact that altogether of men who reached the rank of brigadier or major-general in the Civil War, 46 became converts before their deaths.

The Catholic population of the United States had been growing very rapidly during the decades just before the war between the States. The newly made citizens faced their duty to their adopted country bravely and with few exceptions whole heartedly. Archbishop Hughes more than any other gave the keynote to patriotism for his fellow countrymen at the North. The archbishop of New York had long considered that slavery was a blot on this country and as a young man at college in lyrical mood had invoked Columbia to "chase foul bondage from her Southern plain." In his controversy with Breckenridge he had pointed out the absurdity of paying a compliment to our "memorable Declaration of Independence," coupled with an allusion to slavery. He had taken firm ground against the radical abolitionists, however, pointing out that they had committed the very crime of attempting to overthrow the Constitution and government of the United States which they charged against the Southern Confederacy and urging moderation and conciliation on both sides. Once war was declared, however, there was no half-heartedness about his support of the Union.

Another of the distinguished prelates of the second half of the 19th century was Archbishop Martin John Spalding (1810–72), a descendant of a family that had been in this country for many generations. He became bishop of Louisville in 1850 and archbishop of Baltimore in 1864. The growth of the Church, and above all the number of conversions had attracted public attention more than ever to Catholicity and the patriotism of Catholics during the Civil War had moderated much of the intolerance felt toward the Church, and Americans were now more willing to listen to expositions of Catholic doctrine. Archbishop Spalding responded to a deeply felt want by his lectures in many parts of the country and by the breadth of his scholarly erudition succeeded in placing the Church's position properly before the minds of fair-minded Americans. He was the first to suggest the establishment of a Catholic University and to insist that intensive development of the intellectual life would add greatly to the Church's position. He came to be held in high esteem by prominent men of all classes and sects in the United States. When the Second Plenary Council of the Church in the United States met at Baltimore in 1866 under the primacy of Archbishop Spalding the Catholic population had doubled to nearly 4,000,000, and though the increase was very largely due to Irish and German immigration, the feeling was growing throughout the country that our new citizens were being trained to genuine Americanism under the influence of the Church whose hierarchy was deeply patriotic in its policies.

Two distinguished prelates who have been called "Fathers of the American Church" were the Kenricks — Irish by birth but thoroughly American in their influence on the Church. Francis Patrick Kenrick was for a time bishop of Philadelphia (1830), and was transferred to the archbishopric of Baltimore in 1851. He was honored by his fellow citizens of Philadelphia for his courageous zeal during an awful epidemic of cholera and for his tact during the native American riots when 40 persons were killed in the city. His brother, Peter Richard Kenrick, became archbishop of Saint Louis in 1847 and lived to celebrate the golden jubilee of his consecration. His firm stand with regard to the Drake Test Law led to a decision by the United States Supreme Court which prevented threatened infringement of the constitutional guarantee of religious liberty.

In 1884 when the Third Plenary Council was held, under the primacy of Archbishop (now Cardinal) Gibbons, the Catholic population had actually doubled once more to 8,000,000. The new primate, Cardinal Gibbons, was destined to occupy a place of particular affection in the hearts of the American people and to be looked upon as a typical representative of all that was conservative in American life. His published opinions came to be looked upon as almost national messages, always read with attention and considered with reverence. The Church continued to grow rapidly under the favoring influence of religious liberty and doubled once more in numbers by the beginning of the new century.

Religious education came very early to be recognized as an extremely important factor for the Church's growth in the United States and for the conservation of the spirit of Christianity. The Catholic hierarchy was firmly persuaded, to use Herbert Spencer's word, that "it works grave mischief whenever intellectualization precedes moralization." The first Catholic college, that of Georgetown, was established in 1789, the very year of the organization of the

Union. Other colleges followed until now there are 22 universities, more than a dozen of them with over 1,000 students in attendance, some 200 colleges for boys with over 50,000 students in attendance, not including 102 ecclesiastical seminaries with some 7,000 students. Catholic higher education for women began with the establishment of the Visitation Academy, Georgetown, D. C., in 1799. Mrs. Seton's organization of the Sisters of Charity and the foundation of Saint Joseph's Academy, Emmittsburg, followed in 1809. The first institution for giving anything more than education in the ordinary branches to girls in New England was the Ursuline Academy in Charlestown, Mass., opened in 1834 and though mainly attended by the children of Protestant parents, burned down that year by a mob from Boston at the risk of the lives of some of the pupils. There are now some 700 Sisters' academies with over 100,000 pupils in attendance. In keeping with the times these have developed 39 colleges for women, some of them offering graduate as well as undergraduate instruction. The Sisters teach in the parochial schools, over 50,000 of them being devoted to this work, teaching more than 1,500,000 pupils.

After education the Church has considered its most important work the organization of charity. The oldest hospital founded by private beneficence still in existence in what is now the United States is the Charity (Sisters) Hospital at New Orleans dating from 1720. In 1829 four Sisters of Charity went to Saint Louis from Emmittsburg to open the Mullanphy Hospital, which had been endowed by Mr. John Mullanphy. In 1832 when an outbreak of cholera in Blockley Hospital, Philadelphia, utterly disorganized that hospital, six sisters, by request of Bishop Kenrick, started from Emmittsburg within two hours after the summons and took charge, restoring order there and giving the institution «its one short interregnum of peace in the distressing reign of violence, neglect and cruelty.» (Nutting and Dock, 'History of Nursing'). In 1847 Mercy Hospital, Pittsburgh, was founded, to be followed by a chain of hospitals under the care of the Sisters of Mercy throughout the country. In 1849 Saint Vincent's Hospital, New York, was established by the Sisters of Charity, and since then the same sisters have opened 11 other hospitals in the greater city. Carney Hospital, Boston, was founded in 1868, and since then Sisters' hospitals have come to occupy a prominent place in American life, there being now some 530 Catholic hospitals in the country, caring for 1,000,000 patients a year. Besides they have charge of the orphans, of the foundlings and of a number of institutions for the old as well as for the insane and the tuberculous. Mother Cabrini founded a series of hospitals, beginning with Columbus Hospital, New York, 1892, orphan asylums and schools in this country for the Italians, which have helped very much in solving the social problems connected with this large group of new citizens.

Very early in our history missionaries among the Indians continued some of the good work that had been done in Colonial days in christianizing and civilizing the Indians. The «black robe» of the Jesuits became a power among them. Father Peter de Smet, S.J., the «Apostle of the Rocky Mountains,» served the Indians of the Middle West for fully 50 years (1821–71) and was often called upon to use his influence with hostile tribes. Of the 300,000 Indians in the United States 60,000 are Catholics, ministered to by 160 priests. There are about 100 Catholic schools for Indian children containing some 5,000 pupils. Missionary effort among the negroes has been even more active. More than 100,000 of our colored population are Catholics, served by 170 priests. Nine religious communities of men and 23 of women are represented in the negro work. Mother Drexel's foundations for the Indians and negroes have accomplished magnificent results. There are now 150 Catholic schools for negroes with an attendance of about 15,000 children.

Toward the end of the 19th and the beginning of the 20th century the Church in the United States received large additions to its number through the immigrants from the Slav countries. At the present time the Slav Catholics are calculated to number nearly 5,000,000 in the United States. Three millions of these are Poles, 1,000,000 are Bohemians and Slovaks, 250,000 Croatians, 125,000 Slovenians and 500,000 Ruthenians. Practically all the Poles in the United States are Catholics and very faithful to their religion. They have 750 priests, more than 500 churches and 20 Catholic newspapers in their own language. The Bohemians have 250 priests and 100 churches. The Ruthenians, the term being applied to those who come from Austria, have become important in our population in Pennsylvania, New York, New Jersey and Ohio. They are practically all Uniats, that is, in union with Rome but not using the Latin rite. They have some handsome churches and 150 priests, some 64 being married. It has been decreed that there should be no addition to the married clergy in this country either by immigration or ordination. The Greek Catholic Union among the Ruthenians is a powerful organization with a membership of nearly 50,000. There is an order of Ruthenian Sisters of the Order of Saint Basil who take charge of parochial schools. The Church demonstrates the validity of her name of Catholic by gathering into the fold here all the foreign nationalities — Rumanians, Albanians, Syrians and Armenians. All of these have priests of their own and follow their own rites, to which they were accustomed at home. New York as the port of entry for immigration caught numbers of all these peoples so that mass is now said in New York in seven different languages, according to a series of rites. All these peoples, except the Ruthenian Greeks, who are organized in one diocese, under a Ruthenian prelate, are under the jurisdiction of the ordinary ecclesiastical authorities in this country and of course of the Pope.

This large foreign immigration to America has introduced a series of new problems and elements into our political life. They are not very different from those which occurred as a consequence of German and Irish immigration at the middle of the 19th century. The Church was an important factor in the transformation of these European stocks into American citizens of sterling patriotism. Her ministrations under the direction of a hierarchy that has shown itself thoroughly American and free from any political bias that might hamper our free development, is accomplishing a similar transformation for the

Slavs and the Italians. President McKinley declared the influence of the Catholic Church in this matter as extremely precious for the future welfare of the country. The decided stand taken by the Church against all the forces of anarchy has meant much for preserving the balance of conservatism among these newly arrived peoples, so liable in the first flush of their enjoyment of liberty to go too far in what they expect of it.

Catholic societies organized to foster social aims, provide fraternal insurance and organize public opinion against abuses and immoralities of various kinds have become increasingly prominent in American life. The Holy Name Society, organized to discourage blasphemy, but doing social work of many kinds, counts a membership of a million. The temperance societies of the Church represent another million. The American Federation of Catholic Societies, organized to oppose immoral tendencies and intolerant legislation, has nearly 5,000,000 members affiliated. The Knights of Columbus, who came into public prominence in connection with the war in their organization of social life for the soldiers in the cantonments here and behind the line in France, have a membership of 400,000 men definitely engaged by their fraternal pledges to patriotism and work for social purposes. Some 350 Catholic periodicals, most of them weeklies, are published in the United States. They include 46 German, 18 French, 15 Polish, 7 Bohemian, 5 Italian, two each Slovene, Dutch and Magyar and one each Spanish, Croatian and Indian publications.

In 1918 the Catholic population in the continental United States was estimated to be nearly 18,000,000, with the hierarchy consisting of three cardinals, 16 archbishops and 100 bishops. There are 20,000 priests, about 5,000 of whom are members of religious orders — Jesuits 1,200, Benedictine 750, Franciscans 700, Redemptorists 500, Vincentians 300, Dominicans 250 and many smaller orders. There are some 85,000 women in religious communities. The American occupation of the Philippines added a Catholic population of 7,000,000 with one archbishop, 11 bishops and 1,250 priests; Porto Rico another 1,000,000, with a bishop and 150 priests; Hawaii, 40,000, with a bishop and 50 priests; Guam, 14,000, with a bishop and 10 priests; Samoa, 1,000, with 4 priests, and the Canal Zone about 4,000, with 4 priests.

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JAMES J. WALSH,
Author of 'Catholic Churchmen in Science,' 'The Popes in Science,' etc.

CATHOLIC COLLEGES IN EUROPE, American. (1) The Pontifical College of the United States at Rome, Italy; address: Via della Umilta, 30. This institution was founded by Pius IX and was formally opened by him 8 Dec. 1859. In 1884 Leo XIII ranked it among pontifical colleges, with the privileges thereto appertaining. Ecclesiastical students only are admitted; students pursuing the courses in the humanities, philosophy and theology at the Urban College of the Propaganda. In 1916 the number of students was reported as 158. (2) The American College at Louvain, Belgium. This was founded in 1857 by several American bishops. The rules and constitutions were confirmed by Leo XIII in 1895. The objects of the institution are to educate for the priesthood American students sent by their bishops to Louvain, and to prepare students from Belgium and adjacent countries for important missions in dioceses of America. Only those students are admitted who have finished a complete course in philosophy at a Catholic college. There is a three years' course in theology at the University of Louvain, followed by higher studies leading to the various degrees in theology and canon law. Its activities were suspended in 1914 when, early in the European War, the city of Louvain was burned by the Germans.

CATHOLIC COPTS, those native Egyptian Christians, about 5,000 in number, who acknowledge the authority of the Pope. The word Copt is an adaptation of the Arabic «Qibt» or «Qubt» (a corruption of Αἰγύπτος). See COPTS.

CATHOLIC CREDITOR, in Scottish law, a creditor whose debt is secured by a lien or charge on more than one subject belonging to the debtor.

CATHOLIC EDUCATION IN THE UNITED STATES. Historical.— The first schools within the present limits of the United States were those founded by the Franciscans in Florida and New Mexico. Saint Augustine, Fla., had a classical school as early as 1606, and there were a number of schools in existence for the natives of New Mexico in the year 1629. Schools for the natives were likewise

established in Texas and California, with the foundation of the missions in those regions. Ursuline nuns from France established a parish school and academy in New Orleans in 1727, a few years after the foundation of the city. French schools, for both white and native children, were also opened at Saint Louis, Detroit and other settlements to the north. In general, it may be said that Catholic school work usually began in a place, whether it was a white or an Indian settlement, as soon as there was a sufficient Catholic population and organization to furnish support for the school. In the East, the Jesuits in Maryland had opened schools by the year 1650, and a college or "school for humanities," was established there in 1677. Later on, a boarding school was opened at Bohemia, on the eastern shore of Maryland; among the famous pupils at this institution were John Carroll and Leonard Neale, who subsequently became archbishops of Baltimore, and Charles Carroll of Carrollton, one of the signers of the Declaration of Independence. Georgetown College was founded in the year 1789. A more favorable opportunity for educational work was offered to the Jesuits in Pennsylvania, owing to the tolerant attitude of the Quakers, and, with the organization of the first Catholic parish in Philadelphia in 1730, the foundation of schools as a regular and permanent feature of parish work may be said to have begun. Philadelphia had a larger Catholic population than any other town in the country, and the system of schools that was gradually established there and throughout Pennsylvania as new parishes were organized became a model to Catholics elsewhere. A new impulse was given to Catholic education by the American Revolution. Catholic immigrants came in increasing numbers, and learned priests, exiled by the French Revolution, arrived opportunely to take up the work of organizing parishes, schools and colleges. In 1791 the Sulpicians founded Saint Mary's Seminary at Baltimore. Foremost in Catholic educational work west of the Alleghenies were Fathers Stephen T. Badin and Charles Nerinckx in Kentucky, Father Gabriel Richard in Detroit and Michigan and Father Edward Fenwick, a Dominican, first bishop of Cincinnati, in Ohio. What was accomplished in these three States had a very important influence in the development of Catholic education throughout the whole Middle West later on. During the period 1800–40 the progress of Catholic education, while slow, was steady and solid, and corresponded with the growth of the Church. Catholic textbooks began to appear, and, more important still, religious sisterhoods were organized to carry on the work of teaching in the schools. The first teaching sisters in the English-speaking States were the Poor Clares, who opened a school at Georgetown in 1801. This order soon discontinued educational work; but in 1812 an American branch of the Visitation Order was founded at the same place by Bishop Neale. Mrs. Elizabeth A. Seton, under the direction of Father Dubourg, organized the Sisters of Charity at Emmittsburg in 1809; this community grew rapidly and furnished teachers to Catholic schools in all parts of the country. Shortly afterward, three teaching communities were founded in Kentucky — the Sisters of Loretto, the Sisters of Charity of Nazareth and the Sisters of Saint Dominic. These five teaching communities rendered it possible for Catholics to carry on their schools and academies without aid from the state, and to extend the educational system to new centres of Catholic life as fast as these became organized. Among the religious orders of men, the work of the Lazarists and Jesuits during this period deserves particular mention, the latter having laid the foundations of Saint Louis University in 1828. Another great forward movement in Catholic education originated in the tide of immigration that set in about the year 1840. Hundreds of thousands of Catholic Irish and Germans made their way to the Middle Western States and beyond. Zealous priests and bishops of the newly-created dioceses labored to erect everywhere not only churches but schools. After the failure of Bishop John Hughes of New York to secure for the Catholic schools of that city a share of the public educational funds, although his efforts were warmly seconded at Albany by Governor Seward, it was more keenly realized by Catholics that it had become a matter of religious necessity for them to erect and maintain their own schools and that, as Bishop Hughes declared, "In this age and country the school is more necessary than the church." At the instance of the bishops many new teaching communities came from Europe, and their membership was rapidly augmented under the favorable conditions offered for religious and educational work. The result was that, while in the year 1840 there were only about 200 parish schools in the country, this number was multiplied several times over during the ensuing decade. Academies for girls were established by the Ladies of the Sacred Heart and other sisterhoods while the Christian Brothers took the lead in the field of secondary education for boys. Colleges and seminaries also sprang up. The Jesuits carried their work of higher education into every section of the country by founding colleges and preparatory schools. A later phase of the immigration movement resulted in the establishment of schools for French-Canadians, Poles, Italians, Bohemians and other nationalities. Of these, the Polish schools are the most numerous.

School Organization.— In accordance with the Church's organization, Catholic elementary education is framed along diocesan lines. Each diocese has its school system, with the bishop at its head. Bishops, however, are bound by the legislation of the Third Plenary Council of Baltimore, which prescribed a definite form of school organization for all the dioceses. General legislation has thus operated to give a certain measure of unity to parish-school work the country over, while local needs and interests are left to be provided for by the diocesan authorities Diocesan control over the schools is usually exercised through the diocesan school board, presided over by the bishop. The members are selected from the clergy of the diocese; in some places the laity are included. In the prevailing type of school organization the school board includes, as its executive officer, a diocesan superintendent of schools. The priest who is selected for this office is specially trained for his work; he devotes his time to the inspection of schools and

to the study of the problems involved in their improvement, and his recommendations are embodied in an annual report submitted to the school board. As assistants to the superintendent there are in many dioceses community inspectors of schools. As a rule, there are many teaching orders engaged in any given diocese, and when each community appoints one of its members to inspect and study the work that is being done in its own schools in the diocese, the result is to give the superintendent a corps of zealous and efficient assistants through whose co-operation his recommendations may the more easily be given practical effect. In the case of the individual parish school, the pastor is, of course, by right its head; but generally speaking beyond supervising the religious instruction and financial matters, he leaves the direction and control of the school to the superior of the Sisters or Brothers in charge. The actual principal of the school is therefore the immediate religious superior. The teachers usually live in or near the school building, which is in close proximity to the parish church. About nine-tenths of the teachers in the parish schools are religious. Male teachers are less than one-fifteenth of the total number. Nearly 300 distinct communities are engaged in the work, including single independent houses as well as congregations. Of these, 11 are teaching brotherhoods. The curriculum of the parish school does not, as a rule, show any substantial difference from the curriculum of the neighboring public schools, except in the matter of religious instruction.

The training course for religious teachers embraces the postulate, the novitiate and the normal school. In the postulate are comprised the elements of a good common-school education and some high school work; during the novitiate — generally of one year — study is continued, but the chief aim is the religious formation of the candidate; in the normal school, proximate preparation is made for the work of teaching, through suitable pedagogical studies, while more advanced academic courses, sometimes leading to the college degree, are also taken up. Such is the training course that obtains in the more progressive communities; in many instances, however, this ideal program is not strictly adhered to in practice, owing to the demand for teachers. But the tendency is steadily toward higher standards. Much has been accomplished in this direction through the work of summer institutes and summer schools conducted especially for teachers by colleges and universities. Worthy of special mention in this connection is the Sisters' College, at the Catholic University of America, Washington, D. C. Many sisterhoods are now sending picked young teachers to this institution for college and university courses as well as normal-school training. Money for the support of the schools is obtained from three sources, tuition fees, the parish treasury and endowments. The amount derived from the last-mentioned source is practically a negligible quantity, except in the case of a few favored schools. The tuition fee — the fee ranging from 50 cents to a dollar a month — was long the prevailing source of school revenue, but of late years it has been replaced to a great extent by the simpler and more direct means of support, the parish treasury, especially in the cities and larger towns. Schools thus supported are called "free schools." In many places, in accordance with the practice in public schools, textbooks are also supplied free. The salaries of sisters engaged in parish-school work probably average $25 per month, or $250 per year. Brothers who teach in the parish schools generally receive from $300 to $400 a year. Teachers in Catholic schools thus receive less than one-half the salary of public-school teachers of the same class, and in many parts of the country they receive barely one-third as much. Yet out of their slender salaries the religious teachers have not only to maintain themselves, but also to save something as a contribution to the support of the mother-house and its various establishments, such as the training schools, the infirmary, etc. Only by the practice of the strictest economy, joined to the most devoted personal self-sacrifice, are the members of religious communities enabled to accomplish these objects successfully. As might be inferred from the above data elementary education in Catholic schools costs less than one-half as much as elementary education in public schools. The actual cost per capita of Catholic elementary schooling throughout the country averages only from eight to nine dollars a year.

Alongside the parish-school system there have been developed secondary schools or high schools. These belong to several distinct types: the college preparatory school; the parish high school — an adjunct of a particular parish school; the diocesan high school, under the control of the bishop; and the independent high school, conducted by a religious order and more or less independent of diocesan control. There is a strong movement toward the more general establishment of diocesan high schools, since these form an integral part of the diocesan school system and thus contribute more effectively to the unification of Catholic educational work. Notable among institutions of this class, for their typical character and influence, are the Boys' Central High School and the Girls' High School in Philadelphia.

An important agency in the changes that have been brought about in Catholic education in the direction of more perfect organization has been the Catholic Educational Association, which was organized in 1904, and includes three main departments — schools, colleges and seminaries.

School Enrolment.— In the year 1918 there were 5,488 Catholic elementary schools in the United States with an enrolment of 1,456,206 pupils, and with about 36,000 teachers. Elementary pupils in high schools and academies would make an addition of about 100,000 to this number. Investigation has shown that the total actual enrolment in Catholic schools is not quite one-half that which the Catholic population of the country should normally supply, the proportion being as 893 to 1,948. This means that about the same number of Catholic children go to the public schools as go to the parish schools. There are over 100 Catholic industrial schools; many girls' schools furnish instruction in the upper grades, in practical household subjects.

Included in the total school enrolment just given are 137 schools for colored children, with an enrolment of 13,885, about one-fourth of these being in the archdiocese of New Or-

leans. A number of teaching communities devote themselves especially to this work, several of these being composed of colored Sisters. These schools as a rule derive their support from general church collections and gifts from generous individuals. There were also 72 schools for the education of Indians, with 5,674 pupils. Orphanages — not included in the above total — number 293, with 45,059 children. There are about a dozen Catholic schools for the deaf and dumb, with an enrolment of approximately 1,000.

Colleges.— Catholic male colleges and universities in the year 1916 numbered 84, with an enrolment of 14,846 students of collegiate grade; of these 6,177 were pursuing professional courses, while 974 were registered in engineering courses. Colleges for girls had at least 1,000 collegiate students. The enrolment in Catholic colleges is increasing rapidly, the ratio of collegiate students in such institutions to every 1,000,000 persons of the Catholic population having increased from 511 in the year 1907 to 896 in the year 1916. The movement toward the development of universities, which has been characteristic of the progress of American higher education, has affected many of the larger Catholic colleges. Thirty-nine institutions now have at least one professional department, while quite a number have several professional departments, in addition to post-graduate courses of study. Pre-eminent among Catholic institutions of higher education in the United States is the Catholic University of America, which is under the direction of the bishops, and which has a large post-graduate attendance and many affiliated institutions.

The college department of the Catholic Educational Association demands a requirement of 16 units for entrance to college and 128 hours as a minimum for graduation. Other requirements relating to the work and equipment of the college have been adopted, and at the Buffalo meeting of the Association, in 1917, a committee was appointed by the colleges to carry out the work of standardization and classification. Seventy-six institutions are conducted by the religious orders. Catholic colleges and universities are as a rule self-supporting; only a few are even partially endowed, with the exception of the Catholic University. Religious professors receive no salary, the services they render being entirely gratuitous; hence the college, being free to a great extent from the heavy financial burden of professors' salaries, is able to devote the revenue derived from student fees to its general expenses. Lay professors are not excluded, but their number is relatively small, except in a few instances. There is, however, a tendency to increase the numl er of lay professors; many of the colleges are endeavoring to raise endowment funds, largely with this end in view, and considerable success has attended these efforts. At any of the large Catholic colleges, if salaried laymen were to replace the religious teachers and officials, the change would involve an expense ranging from $50,000 to $100,000 a year — which would represent a capital between one and two million dollars. The gratuitously rendered services of the religious professors at the Catholic college or university are therefore equivalent to an endowment fund, and in many instances its amount will compare favorably with the endowment of the better equipped non-Catholic institutions.

Seminaries.— Catholic seminaries in the United States are either diocesan or religious, the former being destined for the training of the secular or diocesan clergy, and the latter for the training of the clergy of the religious orders. Diocesan seminaries are usually conducted by secular priests under the direction of the Ordinary, while religious seminaries are in charge of members of the respective religious orders. The diocesan seminaries, although not nearly so numerous as the religious seminaries, have in the aggregate almost twice as many students as the latter; in the year 1915 there were 21 of the former with an enrolment of 2,282, and 46 of the latter with an enrolment of only 1,394. Of preparatory seminaries — these schools cover the ground of the classical course — there were the same year 11 diocesan institutions with an enrolment of 1,727 and 23 belonging to the religious orders with an enrolment of 1,734. Saint Mary's Seminary, Baltimore, in charge of the Sulpicians, is the oldest of the diocesan seminaries, and has over 300 students. The oldest religious seminary is the Jesuit institution at Woodstock, Md., with nearly 200 students. The specific aim of the seminary discipline is the thorough spiritual formation of the candidate for the priesthood. The entrance requirements for admission to the seminary, whether diocesan or religious, involve the completion of the classical course. The length of the curriculum of the diocesan seminary was fixed by the Third Plenary Council of Baltimore at six years, two to be devoted to the study of philosophy and four to the study of theology. Practically the same length of time was prescribed for the curriculum of religious seminaries by recent legislation at Rome. Lecture courses on pedagogy and social and political science have lately been introduced into a number of the seminaries. On the material side, great changes have been made in recent decades. The new Kenrick Seminary at Saint Louis and the seminaries at New York, Boston, Philadelphia, Saint Paul and San Francisco, as well as the new religious establishments at the Catholic University, Washington, are models in the way of modern seminary buildings and equipment. In many other instances, where there has not been a complete reconstruction of the seminary plant, notable changes have been effected, including the erection of new buildings or the extension of old ones, improved sanitary and cuisine arrangements and additions to the library and its equipment. Similar improvements have been made in the case of the preparatory seminaries. As a rule, diocesan seminaries are dependent upon the parish collections for their support. See also PARISH SCHOOLS.

STATISTICAL SUMMARY (1918)

Catholic population of the United States	17,416,303
Parish schools	5,488
Parish school enrolment	1,497,949
High schools	1,260
High school enrolment	74,538
Colleges and universities (1916)	84
Collegiate enrolment	14,846
Seminaries	85
Seminary enrolment	6,201

Bibliography.— Burns, J. A., 'Origin and Establishment of the Catholic School System' (1908); id., 'Growth and Development of the Catholic School System' (1912); id., 'Catholic Education — A Study of Conditions' (1917); *Annual Reports* of the Superintendents of Parish Schools; *Catholic Directory* (Annual); *Annual Reports* and *Bulletins* of the Catholic Educational Association; *Annual Reports* and *Bulletins* of the Commissioner of Education.

JAMES A. BURNS, C.S.C.,
Professor of Moral Theology, Holy Cross College, Brookland, D. C.

CATHOLIC EMANCIPATION ACT, an act of the British Parliament passed in the 10th year of the reign of George IV, 13 April 1829, by which the Catholics of Ireland were relieved of civil disabilities still persisting there after the more odious and oppressive provisions of the penal laws enacted in 1691, in violation of the stipulations of the Treaty of Limerick, had been gradually done away. For 50 years after 1691 those laws were enforced vigorously; from that time to the era of emancipation there was a gradual relaxation. The design of those penal laws was the extermination of the Catholic religion in the island and the administration of the government purely for the behoof of the "Protestant interest" and the "English interest." A Catholic was not permitted to be a landowner, nor even to hold land on lease, save for a brief term; the son of a Catholic could, by making profession of the Protestant religion, come into possession of his father's property, allowing to his parent an annuity; if a Catholic owned a horse, whatever its value, any Protestant might legally seize it on paying to the owner $25; no Catholic priest could lawfully exercise his ministry in Ireland save under severe restrictions, and monks and friars were regarded as felons and punished as such; no Catholic could be a barrister, nor a schoolmaster; Catholics were ineligible to the Parliament of Ireland, or even as electors; they were not permitted to be freemen of boroughs. When the act of union of the kingdom of Ireland with that of Great Britain was passed William Pitt gave solemn assurance to the Catholics of Ireland that the last of their disabilities would be forthwith removed, and bills to that effect were brought into Parliament; but Pitt, giving way before the insane bigotry of King George III, did not press the measure and went out of office. The Catholics continued to demand their enfranchisement and emancipation, and their appeals were heard in the British Parliament; but it was seen that the hope of redress of grievances was vain unless a show of force was made, or a popular agitation set on foot. Daniel O'Connell, already a highly successful counsellor-at-law, though not a barrister, owing to his disability as a Catholic, took the leadership of the Catholics of Ireland, and from 1824 till the act of emancipation was passed, Ireland was the scene of an unprecedented popular agitation, never equalled in any country till the agitation for the repeal of the union with Great Britain was set on foot immediately after the grant of Catholic emancipation. The British Cabinet was alarmed by the outburst of popular enthusiasm in Ireland, and the House of Commons in 1825 passed a relief bill for Ireland, but the Lords rejected it. A second relief bill, two years later, failed in the House of Commons. But the following year, 1828, the House, although the Cabinet (Wellington's) was adverse, passed that second bill. This made the Cabinet and even the King (George IV) pause, and it was confessed that really something might or must be done; but the agitation must cease. The reply of the Irish Catholics was to nominate O'Connell, despite his legal disability, for membership in the Parliament and to elect him triumphantly. He was a member of Parliament-elect, but he would not take the oath whereby he must accept the King's supremacy in religion. It was the King and the Cabinet that had to retreat now. The bill for Catholic emancipation was brought into the House of Commons on 5 March 1829, and passed the first reading by a majority of 188 in a House of 508 members; on the second reading the majority was 180, and on the final vote it was 178 in a House of 462. Even in the Lords the measure was passed by a good majority, and the bill received the King's assent. The rights and privileges accorded to the Catholics of Ireland by this act were: That they were not to be required to take the oath of supremacy; that they became admissible to all offices in corporations and to enjoyment of all municipal rights. But no Catholic could be regent or lord chancellor, either of Great Britain or of Ireland; and they were incapable of holding offices connected with the Established Church or the universities. In all other respects the Catholics were to stand on an equal footing with Protestants. In 1871 the Roman Catholic oath and the declaration concerning transubstantiation were abolished.

CATHOLIC EPISTLES, a group of seven letters in the New Testament which are addressed by apostles to the faithful in general, not to particular churches, as is that to the Philippians, that to the Ephesians, etc.; nor to individuals, as are the epistles of Paul to Timothy, Titus, etc. The Catholic or general epistles are those of James, 1 and 2 Peter, 1, 2 and 3 John, and the epistle of Jude. These same epistles are also styled Canonical, signifying, according to Calmet, that they contain excellent rules (*canones*) of faith and morals. Consult Gloag, 'Introduction to the Catholic Epistles' (Edinburgh 1887); Sanday, W., 'Biblical Inspiration' (London 1896); and Bigg, C. A., 'Commentary on Saint Peter and Saint Jude' (Edinburgh 1902).

CATHOLIC INDIAN MISSIONS, Bureau of, an organization of the Roman Catholic Church, established in 1874 by the archbishop of Baltimore in behalf of the Catholic prelates having Indian missions within their respective dioceses, in order to represent before the government the interests of these prelates in all matters appertaining to Indian affairs. By decree of the Third Plenary Council of Baltimore it was recognized as an institution of the Church and placed under the charge of a committee of seven prelates. This committee was dissolved in 1894; and the bureau as then constituted was superseded by a new corporation. The chief work of the bureau is the establishment of schools among the Indian tribes and obtaining funds for their maintenance. The bureau publishes each year a report of the

director, and its past publications include 'Annals of Catholic Indian Missions in America' (1877–81) and 'The Bureau of Catholic Indian Missions 1874–95.' From time to time it circulates statistics concerning its work. See INDIAN, CATHOLIC EDUCATION OF THE.

CATHOLIC INDIAN MISSIONS OF THE UNITED STATES (referring exclusively to actual missionary effort made within the present boundaries of the United States).

Early Period.— Although priests had visited the present territory of the United States previous to the advent into New Mexico of the Franciscan Friar Mark of Nice (1539), Catholic mission work properly dates from the expedition of Coronado the year following. Franciscan friars were the pioneers; it was chiefly they who evangelized the tribes of Florida, Texas, New Mexico, Arizona and Upper California. Their exceedingly long roll of missionaries, many of them martyrs, contains such illustrious names as John of Padilla, the protomartyr of the United States missions (New Mexico 1542), Francis Pareja (Florida 1612), who published several treatises in Timuquanan, his 'Doctrina Christiana' being the first work in any Indian language of this country to issue from the press; Ven. Anthony Margil of Jesus (Texas 1716); Junipero Serra (California 1769–84). The Dominicans gave to Florida Luis Cancer, the martyr (1549), Dominic of the Annunciation, Salazar and others (1559). The Jesuits were pre-eminently the apostles of the North, their missions extending from Maine to the Mississippi River. They also announced the Gospel in many other portions of the country. Among their best-known missionaries were Martinez (Florida 1566); Rogel (South Carolina 1569); Kühn (Arizona 1687); the illustrious martyr Jogues (New York 1646); Chaumont and Dablon (New York 1654); Le Moyne (New York 1661); Allouez (Wisconsin 1670); Marquette (discoverer of the upper Mississippi 1673); Rale (Maine 1724); Dupoisson (Natchez 1729). Besides Franciscans and Jesuits, other priests engaged in the work, and Christianity was preached to the natives throughout the length and breadth of the land.

Results.— In many instances the missions flourished exceedingly; the Indians received a rudimentary education and were brought to a high state of civilization. In 1630 there were in New Mexico about 35,000 Christian Indians, living in 90 pueblos, each pueblo having its church, attended from 25 mission residences. In 1634 there were in Florida 35 Franciscans maintaining 44 missions, while the Christian Indians numbered between 25,000 and 30,000. In California the results were equally satisfactory. The fruits of the labors of the early missionaries may still be seen among the Indians of New Mexico, Arizona, California, Minnesota, Wisconsin, Michigan and Maine. The missionaries not only evangelized the Indians, but they have placed the whole world in their debt by their work of exploring and colonizing, and by their contributions to science. They wrote exhaustively on many topics, and, moreover, preserved to posterity the Indian languages by means of numerous lexicons, grammars and books of devotion and instruction.

The Missions Revived.— In the last century the tribes of the great Northwest were evangelized principally by the modern apostle of the Indians, Peter John De Smet, S.J. (1838–73) and his Jesuit colaborers. The Jesuits, moreover, established missions among the tribes of Alaska. Other noted missionaries of the period were the Benedictine monks, who have met with marked success, especially in Minnesota and the Dakotas; and Bishop Baraga (Michigan 1830–68); Archbishop Blanchet (Oregon 1838–80); Bishop Marty, O.S.B. (Dakota 1876–94).

One of the results of President Grant's «Peace Policy» was the establishing, in 1874, at Washington, D. C., of the Bureau of Catholic Indian Missions to represent Catholic Indian interests at the seat of government, to superintend Catholic agencies and to obtain other agencies falling by the terms of the peace policy to the Catholic Church. Upon the modification of the peace policy, the bureau turned its attention to the establishing of schools and the aiding of missions, and since the withdrawal of government aid from Indian mission schools, it provides financial support for such Catholic institutions. The history of the bureau since its inception is intimately bound up with that of the missions. It has established over 50 schools, which represent an investment of more than $1,000,000. The name most prominent in Catholic Indian mission work of the present day is that of Mother M. Katharine Drexel, foundress of the Sisters of the Blessed Sacrament for Indians and Colored People, who has devoted her life and a very large fortune to mission work among the Indians and negroes.

Present Status.— The tribes wholly or partially Catholic are: Arickaree, Assinaboine, Abenaki, Blackfeet, Cœur d'Alene, Chippewa, Crow, Colville, Digger, Flathead, Gros Ventre, Huron, Kalapuya, Mohawk, Mandan, Menominee, Mission, Nez Percé, Osage, Ottawa, Pottawatomie, Piegan, Passamaquoddy, Pueblo, Papago, Pima, Quapaw, Sioux, Saint Regis, Tinneh, Tulalip, Umatilla, Winnebago, Wenatchi and Yakima. Catholics are also to be found among the Arapahos, Choctaws, Cherokees, Chickasaws, Creeks, Comanches, Cayugas, Miamis, Northern Cheyennes, Otos, Oneidas, Poncas, Peorias, Stockbridges, Sauk and Foxes and Yumas. Most of these tribes are provided with missions, while a number of others live in the vicinity of missions and fall under Catholic influence. Consequently Catholic Indian mission work is carried on in Alaska, Arizona, California, Idaho, Kansas, Minnesota, Michigan, Maine, Montana, Mississippi, New Mexico, Nebraska, New York, North Dakota, Oregon, Oklahoma, South Dakota, Washington, Wisconsin, Wyoming. Elsewhere small remains of tribes are cared for by the parochial clergy. More than 150 priests, both secular and regular, aided by catechists (Indian and white), labor on the Indian missions. The total number of priests, teaching brothers, lay brothers, scholastics, sisters and secular teachers engaged in Indian educational work is about 650. There are about 100 schools (boarding and day), with over 6,000 pupils; about 200 churches and chapels; and the value of church and school buildings is not less than $1,500,000. The mission records show annually about 3,500 baptisms, 600 Christian marriages, 1,200 Chris-

tian burials. Of a total Indian population of 291,014 about 100,000 are Catholics.

Consult Shea, 'The Catholic Church in Colonial Days' (1886); and 'History of the Catholic Church in the United States — 1844 to 1866' (New York 1892); O'Gorman, 'A History of the Roman Catholic Church in the United States' (ib. 1895); Reports of Bureau of Catholic Indian Missions from 1874; Reports of Commissioner of Indian Affairs.

REV. WM. H. KETCHAM,
Director of the Bureau of Catholic Indian Missions, Washington, D. C.

CATHOLIC KNIGHTS OF AMERICA, a fraternal organization, founded in Nashville, Tenn., in 1877 and chartered under the laws of Kentucky in 1880. Its object primarily was mutual life insurance, but its scope was eventually extended to include the endeavor to unite fraternally all acceptable Roman Catholics of every profession, business and occupation; to give all possible moral and material aid in its power to members of the organization, by holding instructive and scientific lectures, by encouraging each other in business, and by assisting each other to obtain employment, and to establish and maintain a benefit fund for the benefit of the families of the members. The benefit fund is distributed according to well-established insurance rules. The age limits for admission are from 18 to 45. At first men only could become members; but since about 1901, women have been allowed admission on the same conditions as men, except the age limits for women are from 18 to 40. The executive power is vested in the Supreme Council (National) with headquarters in Saint Louis, Mo., the State councils and the officers of the local branches. In 1913 there were 560 branches in the United States, with a membership of 18,300 with a total insurance of $20,610,171. The organization had total assets of $1,168,541, including the reserve fund of $828,000. The claims paid in 1913 amounted to $546,662. Since its organization there has been paid to beneficiaries nearly $15,000,000; but the material aid has been slight compared with the spiritual, moral and intellectual benefit the organization has effected. This is the pioneer Roman Catholic fraternal organization in the United States.

CATHOLIC MAJESTY, a title given by Pope Alexander VI to the kings of Spain, in memory of the complete expulsion of the Moors from Spain in 1491 by Ferdinand of Aragon. But even before that time several Spanish kings are said to have borne this title.

CATHOLIC MISSIONARY UNION, The, an organization of the Roman Catholic Church established "to procure the services of clergymen and laymen of the Roman Catholic Church to teach and preach as missionaries of their faith in the United States and in furtherance of religious opinion"; "to lease, take, hold and purchase places, buildings and lands for such teaching and preaching"; to provide for the maintenance of the workers; to publish and distribute books, pamphlets and other reading matter in connection with these efforts, and to aid archbishops, bishops and other Church authorities in the United States to establish and conduct missions within their respective jurisdictions. Its practical activity takes the form of the collection of funds to enable bishops of the various dioceses to reserve diocesan priests for missions to non-Catholics within their various jurisdictions and to maintain such missionaries in their work. The Apostolic Mission House, on the grounds of the Catholic University, Washington, D. C., is the training-school for diocesan missionaries.

CATHOLIC MUTUAL BENEFIT ASSOCIATION, The. This Association was organized in Niagara Falls, N. Y., July 1876 and was incorporated by the legislature of the State of New York in 1879. It does a fraternal life insurance business, furnishing protection to its members in amounts of $500 to $2,000. It has 64,000 members; 800 local branches throughout United States and Canada; has $82,000,000 insurance in force; and has disbursed over $31,000,000 to families of deceased members, over $1,500,000 being disbursed annually. Its assets amount to about $2,000,000. The qualifications for membership are that a man shall be a practical Catholic, physically sound, of the full age of 16 years and under the age of 50 years. The Corporation is known as the Supreme Council of the Catholic Mutual Benefit Association, and is composed of representatives from each Grand or State Council in addition to its own officers and holds its conventions triennially. Grand councils are composed of their own regular officers and one representative from each branch in their jurisdiction and meets triennially also. The reserve fund is surrounded by the safest and most reliable safeguards for its protection. The Association was one of the first to establish a reserve fund. It has adequate rates, and has complied with the laws of the State of New York, in which it is incorporated, and also with the laws of other States requiring solvency from an actuarial standpoint.

CATHOLIC PRESS OF AMERICA. The formative period of Catholic journalism was an era full of struggles and anxieties when unreasonable attacks were made upon the liberties of Catholics; for at that time the tenets of the Roman Catholic Church were very poorly understood and oftentimes misrepresented by those who were ignorant of her beliefs or who mistrusted her sincerity. The forerunners of the Catholic newspaper were the Irish journals. Although these papers were not distinctly Catholic in purpose, their sympathetic tone toward those of the ancient faith merits for them a place in any description of Catholic journalism. In fact, more than a decade of American history had passed before any Catholic periodical, properly so called, was established. Hence, during this time the principal champions of Catholic doctrines and practices were these Irish papers. As citizens of the United States, the Irish editors frequently were forced to defend with vigor their civil and religious liberties against their enemies, through the kingly power of the press. For years they had fought against British tyrannies in Ireland. In this struggle for freedom they engaged some of the brightest and most intelligent of Erin's sons, many of whom afterward came to America. The soul of this movement was the Society of the United Irishmen, founded in 1791. The purpose of this celebrated organization was to unite Catholics and Protestants into one body devoted to the

parliamentary reform of Ireland. The contributions of Emmet, Sampson, MacNevin and others to the leading newspaper of their native land attracted universal attention. Matthew Carey, William Duane and others in America assisted the efforts of the parent society by their fearless advocacy of the doctrines of the United Irishmen, and that in the face of a Federalist opposition which was beginning to manifest itself at that time. The Federalist press used every species of attack against these Irish associations. The neutralization of existing prejudices and the creation of a more favorable public opinion were the chief causes which prompted the establishment of Irish journals in which the affairs of that nation might be truthfully stated. This need was met by the Irish Catholic weeklies published principally in the two great centres of population, New York and Philadelphia. With one or two exceptions the Irish newspapers, down to the year 1840, had an ephemeral and rather precarious existence. *The Shamrock, or Hibernian Chronicle,* was first issued on 15 Dec. 1810. It suspended publication four times before it was finally discontinued. One of the most eventful years of this paper's career occurred when Rufus King, formerly Ambassador to England, was running for governor of New York. Thomas A. Emmet, on that occasion, came out openly in the press and attacked King with the overwhelming force of his clear and brilliant mind. In March 1816 a systematic opposition to King, headed by Emmet, swept through New York. As these exiles of Erin smote this Cæsar with their trenchant quills they sealed the political fate of one who had been an enemy in their fight for civil and religious liberty. The power of Rufus King, the cunning and crafty adversary of the United Irishmen, was broken. It is true that he continued in public life until 1826, but he was no longer "the first man in the country." His attitude toward the Irish while at the Court of Saint James was exposed by speeches, letters and editorials. Even his own correspondence was used against him with telling effect. He was defeated for the governorship of New York and in 1816 gave up the cherished ambition of his life, the hope of being the chief ruler of the nation. After the checkered career of the *Shamrock,* other papers began to appear in the great centres of population. The *Globe and Emerald* began publication in 1824 in New York and Philadelphia respectively. Then came the *Truth Teller* with its long and interesting history (1825–53). In 1828 the *Irish Shield and Monthly Milesian* made a bid for patronage. Its editor entered upon a suicidal policy of persistent attack on a paper already well established and accomplishing much good in Catholic circles. George Pepper became involved in a libel suit and left New York without a friend. He settled in Philadelphia, where he began the *Irish Shield and Literary Panorama.* This was followed in 1832 by the *Patriot and Shield,* and finally the same year there appeared the *Republican Shield and Literary Observer.* In 1831 another rival of the *Truth Teller,* called the *Irish Advocate,* was started. In its race for favor the new paper claimed not to enter as an antagonist, but as a fair and honorable competitor. Yet in the course of events it soon became apparent that its jealous editor betrayed at times in his conduct the same picaroon instincts for detraction which had characterized the aspersions of the *enfant terrible,* the *Irish Shield.* Another ephemeral journal whose history is shrouded in obscurity was published in Charleston, S. C., in 1829. It was first known as the *Irishman and Charleston Weekly Register,* but it soon changed its name to the *Irishman and Southern Democrat.* The last Irish paper of this era, the *Green Banner,* started 3 Oct. 1835, was a creature of circumstance, and in 1837 on account of certain ecclesiastical difficulties its editor, Father Levins, was obliged to discontinue this otherwise ably-conducted journal. Certain other periodicals, national in their tendencies, were published during this period. Among these we must record the *Michigan Essay and Impartial Observer,* printed in 1809. This was the earliest effort in Catholic pioneer journalism. The little paper owes its origin to Father Gabriel Richard. This illustrious American missionary journeyed to Baltimore in 1808 and on that occasion purchased a printing press and a font of type. These he brought overland to Detroit, setting up his press at Spring Wells in the house of Jacques LaSalle. Many persons have claimed for this press the honor of being the first to be set up in the Northwest, but it is to be questioned whether it was the first in operation in Detroit itself, for there were proclamations issued to the people of this vicinity by Lieutenant-Governor Hamilton as early as the year 1777. The documents were dated at Detroit, showing presumably that they had been printed there. Strange to say, these were the only printed papers that were, over a long stretch of years, credited to Detroit as the place of issue. Some have concluded that the lieutenant-governor's proclamations were dated from Detroit but printed elsewhere. Another press was owned by Alexander and William Macomb, who received it from England in 1785, but there is no evidence that it was ever put in operation. The *Michigan Essay* was not, however, the first newspaper printed in the Northwest. Various papers were already being printed in the territory before the year 1800. Cincinnati and Chillicothe can boast of this means of enlightenment before 1809. In 1824 a Spanish periodical appeared in Philadelphia under the strange appellation, *El Habanero.* This magazine was not professedly Catholic, but since it contained articles on ecclesiastical subjects and was conducted by a Catholic priest, the Very Rev. Padre Don Felix Varela, the journal may with propriety be classed among the contributions to early Catholic periodical literature. Father Varela figured conspicuously for many years as a newspaper editor and controversialist. In 1829 he wrote also for a magazine called *El Messagero Semanal,* conducted by Señor Saco, in Philadelphia. The first strictly religious journal established in this country in defense of Catholic doctrines was the *United States Catholic Miscellany.* It began on 5 June 1822. One may easily understand the need there was for this paper when one considers that Catholics in the newly founded diocese of Charleston were very few, and were scattered over the territory which now embraces the three States of North Carolina, South Carolina and Georgia. At the period of the American Revolution hardly a

single Catholic lived in the whole extent of that country, and the people who inhabited this part of the South were wofully ignorant of Catholic doctrines and practices. Bishop England, the first editor of the *Miscellany*, was quick to recognize the needs of Catholics in America. Among other things, he saw the secular press so filled with absurdities and misrepresentations concerning Catholicism that he felt himself obliged to take up the pen to answer some of these attacks against his religion. The prelate was certain that if he could disarm the honest prejudices of the landed aristocracy in the Carolinas he could soon find his way into their esteem. Once the more independent classes of society were won over, he felt that little effort would be required to influence their less wealthy neighbors. Among the papers located in different parts of the United States which helped to defend the faith in these stormy times one might mention the *Catholic Press*, of Hartford (1829), the *Jesuit and Catholic Sentinel* and its successors in Boston in 1829, the *New York Register and Catholic Diary* (1832), the *Shepherd of the Valley*, of Saint Louis (1832), the *Catholic Herald* of Philadelphia (1833), the *Catholic Journal* of Washington, D. C. (1833), the *Catholic Advocate* of Bardstown (1836), with its immediate precursor, the *Minerva*, and the *New York Catholic Register* (1839). Besides these there were four journals which were fortunate enough to survive the trials and vicissitudes of this exciting period, the *Catholic Telegraph* of Cincinnati (1831), *Der Wahrheitsfreund* (1837), the *New York Freeman's Journal* (1840), and the *Pilot* of Boston (1837).

In drawing this brief outline of the pioneer efforts of Catholic journalists we must not fail to notice the deleterious influence exercised by journals relying in a great measure on Catholic patronage, but whose editors made religion the medium through which much harm was done to the Catholic cause in America. During the year 1822, when the Hogan schism was at its height, the journals of Philadelphia vied with one another in catering to this unpleasant strife. The following papers were frequently employed as organs by the schismatic Hoganites: the *Democratic Press*, the *Aurora*, the *National Gazette*, the *American Sentinel and Mercantile Advertiser* and the *Columbian Observer*. Besides the virulent attacks on Catholics contained in the daily press, there were two weekly papers conducted by the Hoganites, which defended the position of that party with all the ability of which they were capable. These journals were called the *Catholic Herald and Weekly Register* and the *Erin*. Of the former we know little, as there are but a few copies extant. It was the chief organ of the schismatics and was conducted by E. F. Crozet. The witches' cauldron in Macbeth was not filled with worse ingredients than might be found in the *Catholic Herald*. So blasphemous was its tone tone toward Catholic matters generally that it must have even shocked the slumbering consciences of the stubborn Hoganites. The *Erin* has been described in Finotti's 'Bibliographia' as "an angel's name with the devil's tongue." Like every other Irish journal which appeared before or after it, this paper claimed to be a defender of the liberties of Irishmen against persecution. Combating this formidable array of discordant and biased journals, the Catholics possessed one lone journal in Philadelphia which battled gallantly, while it lasted, for truth and justice. It appeared for the first time on Saturday, 22 Feb. 1823, but after a few issues ceased publication. The whole disposition of Catholic journalism during the first half of the 19th century seems to have been to promote the harmony of society by removing from the pathway of non-Catholics the groundless prejudices and prepossessions which had grown up into social barriers, due chiefly to the circulation of misrepresentations and calumnies by the enemies of Catholicism in Europe and America, and the supineness of the Catholic body at large in the face of these fabrications. Until the year 1840 the general policy of Catholic journalism was a defense of Catholicism by vigorous appeals to reason and dogmatic principles. The period was above all one of spirited controversy. Catholic doctrines during the epoch were very imperfectly understood by those outside of the Church. There was a predisposition on the part of all sectarian and secular journals to misrepresent her doctrines in every conceivable way. After the year 1840 there began among the non-Catholics of the land a formulation of better and clearer judgments, which result had been brought about largely by the successful conflicts carried on by Catholic journalists. The newspapers of this period give a contemporary view of the life and spirit of Catholicism in America. It will be impossible, within our space, to give any detailed information regarding the newspapers and magazines that have been founded since these pioneer days. At the present time there are being published 128 newspapers, 128 magazines, 30 quarterlies, 2 bi-weeklies, 9 bi-monthlies and 16 annuals. The State of New York leads in number of Catholic newspapers. The checkered careers of these papers only give us an idea of the trials and vicissitudes of editors elsewhere. In 1848 Thomas D'Arcy McGee started *The Nation* but the editor soon precipitated a controversy with Archbishop Hughes who withdrew his support from the paper and *The Nation* ceased after two years' existence. McGee's next venture, the *American Celt*, had a rather unsettled career. It was published first in Boston, then in Buffalo and finally in New York. It was here purchased by D. and J. Sadlier who gave it the name of *The Tablet*. Quite a galaxy of famous editors at one time or other enlivened the columns of this journal. Dr. J. V. Huntington, Bernard Doran Killian, Wm. Denman, Dr. O. A. Brownson, Dr. Henry J. Anderson, Lawrence Keough and D. P. Conyngham gave some of their best years in journalism to build up the prestige of this paper. During the course of the year 1859 the *New York Freeman's Journal*, conducted by James McMaster, gave Archbishop Hughes considerable trouble on account of the idiosyncracies of its editor. This necessitated the establishment of the *Metropolitan Record* which continued until 1873. In the dying days of the *Metropolitan Record* there appeared in New York a progressive and practical journalist, Patrick V. Hickey, who edited the *Catholic Review* until his death in 1889. At that time Dr. John Talbot Smith took up the work and gave to the journal those rare talents which have always

distinguished his writings. In 1886 the *Catholic News* was founded by Hermann Ridder. During the first year of this paper's existence Dr. John Gilmary Shea, the great Catholic historian, became its editor. Here in the editorial sanctum of the *News* office, Dr. Shea closed a brilliant career and laid the foundations for that efficiency in editorial and business management which has characterized the efforts of his successors on this paper. The *News* is now under the editorial direction of Michael J. Madigan. The neighboring city of Brooklyn made several attempts in Catholic journalism, most of which have been short lived. In 1882 the *Catholic Examiner* was begun. This was followed by the *Leader* in 1884. Of more recent origin is *The Tablet* which is now the diocesan organ. The *Catholic Union and Times* published in Buffalo has always been under strong editorial management. The *Catholic Union* was started in 1872 by Rev. Louis A. Lambert, a man of vigorous yet well-disciplined mind. The editorship later passed to Rev. Patrick Cronin who was a leader among the journalists of his day. Catholic newspapers have also been established in other cities of New York State, principally in Albany and Syracuse. In Albany the earliest was the *Catholic Pioneer* in 1853. All succeeding ventures proved unsuccessful owing to a lack of support. In Syracuse during the second half of the 19th century, several attempts to maintain Catholic weeklies ended in failure. The *Catholic Reflector*, the *Catholic Vindicator* and the *Catholic Sentinel*, each had a feeble existence and ceased publication. At present the *Catholic Sun* is published there. In Philadelphia the need of a Catholic newspaper was felt more urgently than elsewhere on account of the canker-worm of trusteeism. This led to the establishment of the *Catholic Herald* in 1833. Moreover the number of religious periodicals increased with such startling rapidity about the middle of the third decade of the 19th century that very few denominations were without a weekly journal in which they could advance and defend their respective views of doctrine and church government. Needless to say, controversies arose on all sides which became more bitter as time went on and these finally terminated in 1844 in bloodshed, arson, desecration and destruction of church property. In 1856 the *Herald* was consolidated with the *Visitor*, under the management of James McDonald, Charles S. Greene and Charles A. Repplier. It ceased publication about the end of the Civil War. Another *Catholic Herald* was started in 1872 but did not long endure. In 1866 the *Catholic Standard* was first published. After a series of trials, such as was the lot of all newspapers of this period, this paper was amalgamated with a rival *The Times*, started by Rev. Louis A. Lambert in 1892. The new combination known as the *Standard and Times*, was brought about in 1895. To-day this is one of the most authoritative organs of Catholic opinion in America. The only other city in Pennsylvania which has contributed notably to Catholic journalism is Pittsburgh. The *Pittsburgh Catholic* was begun in 1844 by Bishop O'Connor. It has always been ably conducted and it is one of the few early journals to brave the storms of adversity and has grown strong in the defense of Catholicism and its ideals. The summary of early New England journalism is but a panorama of the revivals of religious intolerance. Looking back upon the centuries of Puritan ascendency in America, the descendants of the Pilgrim Fathers had little to be proud of in their treatment of Catholics. As time went on, a little more toleration was practised but Roman Catholics were long regarded as the objects of Puritan distrust and their religion considered "subversive of society." With the War of Independence, the condition of Catholics began to improve but in Boston the admonition of General Washington was required to calm the passions and the prejudices of its populace. For years there lingered within the confines of the Puritan heart mistrust and apprehension of the Catholic religion. After the framing of the constitution they threw all their prestige into the Federalist party and succeeded in electing John Adams. Hardly had he gained power than, listening to their promptings, the Congress passed the celebrated Alien and Sedition laws. These imprudent measures caused the hordes of immigrants that flocked to America to seek refuge in the ranks of their opponents, the Jeffersonian or Republican party. To crown their perfidy as a political organization, the Federalists in 1814, through the Hartford Convention, called a protest against the War of 1812 and recommended that, "naturalized foreigners should be debarred from membership in Congress and from all civil offices under the United States." Such in brief, forms, as it were, the historic background of Catholic journalism in New England.

Boston, being the chief metropolis of New England, presented a fair field for the Catholic journalist. As early as the year 1829 the *Jesuit or Catholic Sentinel* was established. This lasted under various names until 1836. During the course of seven years this journal had the following titles: The *Catholic Intelligencer*, the *Jesuit*, the *Irish and Catholic Sentinel, Literary and Catholic Sentinel* and the *Boston Pilot*. In 1837 it suspended publication and after some months Patrick Donahue summoned up sufficient courage to give Catholic journalism in New England another trial. The *Pilot* was the name given to the new journal. It was at first a national, rather than a religious paper. The Irish of New England read it because it containel news from Ireland. They helped to build up the circulation of the *Pilot*. In 1842 Thomas D'Arcy McGee, whose brilliant talents were but in their dawn, became the editor. Another editor of some note was Rev. Father Finnotti, who assumed charge in 1852, but his diary states that he had no great love for Patrick Donahue, the publisher. In 1870 the *Pilot* was fortunate in obtaining the services of one who has done more to elevate Catholic journalism from mediocrity than any one preceding him, John Boyle O'Reilly. His genius as a writer was recognized both by the religious and secular press and the influence, therefore, of the *Pilot* became nation-wide. Two editors that maintained the high standard set by O'Reilly were James J. Roche and Katherine Conway. Among the numerous other papers that soon followed the *Pilot*, we may mention the *Catholic Observer* (1847), edited by Orestes A. Brownson, the *Republic* in 1881, *Sacred Heart Review* (1888), *Connecticut*

Catholic in 1876 which afterward became the diocesan organ with the name of the *Catholic Transcript*. Another well-edited New England paper is the *Providence Visitor*. Scattered throughout the South various newspapers have from time to time been published, most of them being forced to suspend publication after a few years of precarious existence. The *Catholic Mirror* of Baltimore, started in 1849, had considerable influence before the Civil War, but after that time its prestige waned although the paper was issued until 1908. The *Catholic Guardian*, of Louisville, began in 1858 but lasted only four years. The *Catholic Advocate* of earlier days was revived in Louisville under the name of the *Central Catholic Advocate*. In 1896 it consolidated with the *Midland Review* but despite the combined circulation and the services of the versatile editor, Charles J. O'Malley, it died after four years. In New Orleans the *Morning Star* was conducted by Rev. Abram Ryan and James R. Randall, two poets of considerable ability. In Memphis the *Southern Catholic* (1874) suspended and gave place to the *Catholic Journal*. At Saint Louis the *Western Watchman* (1865) has survived mainly through the personality of Rev. D. S. Phelan, who, like McMaster of the *Freeman's Journal*, was a free lance in Catholic journalism. In Ohio, the *Catholic Universe* established in 1874, and the *Catholic Columbian* (1875), as well as the *Catholic Record* of Toledo (1905), are still doing excellent service for Catholicism. The earliest venture of Catholic journalism in Illinois occurred in 1852 when the *Western Tablet* was started in Chicago. Several feeble efforts were without success until the *New World* was established in 1892, with Charles J. O'Malley as editor, reaching the acme of its greatness under his supervision. In 1895 the *Western Catholic* was started at Quincy, Ill., and is still being published. In recent years Indiana has established two newspapers, the *Indiana Catholic*, under the able editorship of J. P. O'Mahony, and *Our Sunday Visitor*, published by Rev. Dr. Noll. This latter journal has done much in allaying persecution and in counteracting the influence of anti-Catholic journals. Its circulation at the present time is by far the largest of any Catholic journal in the United States. *Our Sunday Visitor* has a circulation of close to 2,000,000. The interests of the archdiocese of Detroit are looked after chiefly by the *Michigan Catholic*.

Within the last quarter of a century many journals have appeared in several States beyond the Mississippi. There are only two that antedate that period that are still being published: The *San Francisco Monitor* begun in 1852, and the *Catholic Sentinel* of Portland (1870). The following is a list of the journals that are still being published: The *Intermountain Catholic* (1899), *Catholic Tribune* of Dubuque (1899), *True Voice* (1903), *Catholic Register* of Kansas City (1899), *San Francisco Leader* (1892), *Catholic Herald* of Sacramento (1908), *Tidings*, of Los Angeles (1895).

The early efforts in magazine editing met with the same discouragements that the newspaper men experienced. The first quarterly review of any kind to be started in the United States (*The American Review of History and Politics*) — was edited by Robert Walsh, a Catholic, during the year 1811–12. In 1819 a magazine was begun, known as the *Globe*. This was the outgrowth of the *Shamrock or Hibernian Chronicle*. It is doubtful whether there are any numbers of it extant. The *Metropolitan* started in 1830 and was the first Catholic magazine, strictly so called. It was filled with bright gems of Catholic scholarship and had all the claims to immortality but one — patronage. Consequently the monthly was allowed to perish after a brief existence of only one year. Another magazine by the same name was started in 1853 but shared the same fate. A juvenile magazine was founded in 1835 in New York city, known as the *Children's Catholic Magazine*. Only one similar venture had preceded it, a weekly called the *Expostulator* published in 1830 under the same auspices as *The Jesuit* in Boston. In the establishment of the *Children's Catholic Magazine*, the editor was but following the example of other denominations. It was observed that these journals had increased nearly tenfold in a decade and that these periodicals were being liberally patronized and most extensively circulated. Even the most mediocre could claim 5,000 patrons while some of the better class of children's magazines had more than 30,000. The *Children's Catholic Magazine* had 13,000 subscribers. Due to poor management it lasted only two years and then suspended publication and was later revived under the name of the *Young Catholics' Magazine*. In 1842 another monthly magazine was started in Baltimore called the *Religious Cabinet*. At the end of one year its name was changed to the *United States Catholic Magazine*. This review was discontinued in 1847. It had as its contributors some of the best Catholic thinkers of that time, both lay and clerical. *Brownson's Quarterly Review* was published in 1844, suspended in 1864, revived in 1873 and finally ceased in 1875. Dr. Orestes A. Brownson was a man of great erudition and a scholar of national reputation. He attracted many readers to his review. Catholics and non-Catholics alike regarded him as the best philosophical thinker of his time in America. The *Catholic World*, a monthly magazine, was started in 1865 by Father Hecker, founder of the Paulist Fathers. This review is now regarded as one of the most conservative and authoritative Catholic journals in the United States. Its prestige has grown to such a degree that it is consulted by all religious denominations. Another weekly periodical, the *Ave Maria*, started just one year later, being founded by Father Sorin of the Congregation of the Holy Cross, Notre Dame, Ind. This magazine enjoys a very high literary reputation and has perhaps the widest circulation of any Catholic magazine in the United States. It has readers in every part of Christendom. Its staff of contributors are some of the best and most representative Catholic writers in Europe and America. In this same year *The Messenger of the Sacred Heart* was founded by the Jesuits. This was supplemented by another magazine more literary in character called *The Messenger*. In 1910 it was replaced by *America*, a progressive weekly journal that immediately became a leader in Catholic opinion and now enjoys a national reputation. The *American Catholic Quarterly Review*

began in 1876 and is another high class periodical occupying a place similar to *Brownson's Quarterly*, during the middle of the 19th century. It affords a medium whereby Catholic erudition and scholarship finds expression. The following reviews are of more recent origin: *Rosary Magazine* (1891), *Benziger's Magazine* (1898), *Extension Magazine* (1907), *Catholic Fortnightly Review*, *Saint Vincent de Paul Quarterly*, and *Saint John's Quarterly*. In the last 50 years many magazines with a more limited scope have been founded. Some have succeeded, others have failed. The *Ecclesiastical Review* and the *Homiletic Monthly* are two professional magazines for the clergy. Since 1911 the *Catholic Educational Review* has done excellent service in its particular field. Another publication that looks after the interests of primary and secondary education is the *Catholic School Journal*. Catholic history has been preserved through the efforts of contributors to the *American Catholic Historical Researches*, *Records of the American Catholic Historical Society of Philadelphia*, *Records and Studies of the United States Catholic Historical Society* and recently there was added another quarterly called the *Catholic Historical Review*, published at the Catholic University of America. Another product of the scholarship of the same university is a new monthly periodical, the *Catholic Charities Review*. Among those that failed we may enumerate the *De La Salle Monthly* (1867), later changed to the *Manhattan Monthly*, the *Young Crusader* (1868), the *Catholic Record* of Philadelphia (1871), *Central Magazine* of Saint Louis (1872), *Donahue's Magazine* (1878), *Catholic Reading Circle Review*, *Mosher's Magazine*, *The Dolphin*, the *New York Review* (1905), and the *Globe Review*.

As we take a retrospect of the whole history of Catholic journalism we are confronted with the ever-recurring failures, due in large measure to a lack of patronage. From this observation we are led to inquire why Catholics have not more generously supported the Catholic newspaper. The reason is not far to seek, for the Catholic laity in the past has not been a reading people. There are two elements necessary for the cultivation of enlightened expression on problems of the day. First, we must have a thinking people to create sound opinion. Secondly, we must have a means of disseminating it among others. There are leaders in all communities who must be moulders of the best thought. There are also master minds who must analyze it and separate the gold from the dross. With no man thinking or leading, generations creep their course and die. One of the ideals, therefore, of Catholic journalism is to develop the Catholic mind along correct principles. The Catholic press is needed to defend the right, to advance the truth, to maintain order, morality, intelligence and culture among the adherents of the Church. There is no reason in the world why this high moral and intellectual tone cannot be developed to its fullest in Catholic journalism. The production of genuine Catholic taste and genius is even more possible now than it ever was in the past. Spiritual indolence, mental inertia and indifference are the only obstacles to its success. It was the journalistic genius of John Boyle O'Reilly that made the Boston *Pilot* in his day the greatest Catholic newspaper in America. It was the classic style and polished diction of Bishop England that perplexed his most clever antagonists and compelled them at the end of their controversies with him to admire his candor, his matchless courage, his firmness and gentleness of character. It was the persuasiveness and mental acuteness in the writings of Archbishop Hughes that vanquished the yellow journalists of his time and covered them with shame and confusion. It was the keen and analytic mind of Orestes A. Brownson, the philosopher, that commanded the spontaneous respect of the intellectual leaders of his age. But the Catholic press, through the prestige of such thinkers as these, has even a broader aim. It would have its ethical influence extended to and absorbed by American journalism in general. History has taught that public morality is a condition to any national life. When a nation ceases to esteem and practise the virtues of truthfulness, honesty, integrity and justice, it does not deserve to live. Our government requires a higher plane of public morality than does despotism or monarchy. It is within our means to make a success of popular government by formulating principles which regenerate and strengthen the body of ethical truth by the development of correct sentiments in the press. In this effort the thinking people of the Catholic Church, the most powerful numerically in the United States, can exercise a tremendous influence through the service of the Catholic newspaper as a directing force. Very many people get firm convictions by habitually reading a certain journal. Great then is the moral influence of the press for good or evil. Our modern life mirrors the journal more effectively than news columns reflect life. This is no place for an indictment of the daily press. It is sufficient to say that our metropolitan newspapers of to-day devote over half of their first page to scandals, suicides, divorce proceedings, robberies, murders and other abominable social barbarities. If this is evidence of the moral decadence of our democracy, then there is a clear duty for all of us. The failures we see on every side are due largely to the fact that few think of their vocation as being valuble chiefly as the means of mental and moral improvement. We would remind the journalist that his office is one of public trust. His moral mission in society is to instruct or direct the masses, but to accomplish this he must practise and pursue a sound moral policy. We ask for editors strong, upright men, whose very utterance is the touchstone of a moral mind.

Here, then, is our ideal. We know that in the past men like John Boyle O'Reilly, Bishop England, Archbishop Hughes and Orestes A. Brownson gave a stimulus and a prominence to Catholic journalism that reflected itself in a national way. They compelled recognition and respect from Horace Greeley, Henry Jarvis Raymond, James Gordon Bennett and a score of other prominent newspaper men. John Boyle O'Reilly perhaps did more to clear away prejudices than any other editor of his day. He must be regarded as the premier Catholic journalist of the 19th century. The needs of Catholic journalism in our day demand that we must secure the best journalistic ability and pay well for it. If the Catholic press is to measure up to the ideal set, if it is to be a mighty power

for good, the co-operation of the laity is necessary. The past has demonstrated that without this generous assistance there can be no great standard of excellence, no great measure of success. It has been also the mediocrities of Catholic journalism that have hindered its growth and development. This need no longer be so. Three Catholic universities, Notre Dame, Fordham and Marquette, have during the past decade established schools of journalism, where young men may be trained in scientific, cultural, professional and ethical ways that will enable them to stand in the front rank of editorship. The Catholic laity must in the future respond to the leadership of the scholarly and experienced journalist. They must pay for this high moral and intellectual worth if Catholic journalism is to accomplish its mission.

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PAUL J. FOIK, C.S.C.,
Librarian, Notre Dame University.

CATHOLIC SEMINARIES. The name seminary is generally applied to institutions where candidates for the diocesan priesthood in the Catholic Church receive their spiritual and intellectual training. Preparatory departments (Petite Seminaire) are sometimes found in the same building, but the term is generally applied in the United States to those institutions which admit only those applicants who have completed the collegiate course.

Saint Mary's Seminary, Baltimore, Md., was the first American Catholic seminary. It was founded at the request of Bishop Carroll, who secured from Father Emery in 1791 four priests of the Society of Saint Sulpice, which had been established in Paris by Father Olier in 1642 for the express purpose of training young men for the priesthood. For many years it was the only institution of its kind in the United States, and consequently it supplied to the ranks of the clergy the vast majority of native trained priests. At present there are about 250 seminarians at Saint Mary's. In 1805 it was raised by the Maryland legislature to the rank of a university.

In Saint Charles Theological Seminary, Overbrook, Pa., the aspirants to the priesthood for the archdiocese of Philadelphia are trained. In 1835 Bishop Kenrick placed five ecclesiastical students under the care of his brother, Rev. Peter Kenrick, in a little house on the corner of Fifth and Prune (now Locust street), Philadelphia. This was the humble beginning of the present magnificent establishment. A preparatory department was begun in 1859 at Glen Riddle over which the present Bishop Shanahan of Harrisburg presided for nine years. This institution passed out of existence when, in 1871, the students to the number of 128 took possession of the present building at Overbrook, which had been erected by Bishop Wood. For the maintenance of this institution the Catholics of Philadelphia contribute annually about $35,000. There are approximately 100 seminarists at Overbrook, 15 professors and a library of 25,000 volumes.

Saint Joseph's Seminary, the theological seminary for the archdiocese of New York, is located at Valentine Hill, near Dunwoodie, a station on the Putnam division of the N. Y. C. Railroad, and within the city limits of Yonkers. It was founded by the late Archbishop Corrigan and constructed at a cost of nearly $1,000,000. It was opened in September 1896 and was at first under the direction of the Sulpicians. The full course of study comprises six years, two of which are devoted to philosophy, the remaining four to theology. The faculty comprises 13 regular professors and a few instructors, and the students (who are not admitted until they have completed a classical college course) number abou. 161, nearly all from the archdiocese of New York. This institution has taken the place of the old provincial seminary of Saint Joseph, at Troy, N. Y.

Mount Saint Mary's Theological Seminary, Emmetsburg, Md., was founded in 1808 by Rev. Du Bois during the episcopate of Bishop Carroll of Baltimore, and in the following year 16 young aspirants to holy orders were brought hither from Pigeon Hill, Pa. In 1810 the college had 40 pupils, and as a more commodious building had been erected, the founder gave to Mrs. Seton the log house, which thus became the cradle of the great community of the Sisters of Charity in the United States. United to the seminary is the college department, wherein regular classical and scientific studies are pursued. There are 18 regular professors, several assistant teachers and over 352 students.

Saint Paul Seminary, Groveland Park, Minn., together with the College of Saint Thomas, Merriam Park, was founded by Most Rev. John Ireland, the present archbishop of Saint Paul. They are the result of the generosity of J. J. Hill, late president of the Northern Pacific Railroad, are located within a few miles of the city, have maintained a high grade of scholarship from the beginning and are directly affiliated with the Catholic University in Washington. At present there are 131 students and 12 professors in the seminary proper; in the college 368 students and 17 professors.

Niagara University (formerly Seminary of Our Lady of Angels), founded by Rev. John Lynch of the Congregation of the Mission, a community organized by Saint Vincent de Paul in France in 1625. Father Lynch, the first president, who afterward became the first archbishop of Toronto, in 1856 opened an institution on the lake shore near Buffalo, but finding the place not quite suited for the purpose, he removed in 1857 to the present site on the New York bank

of the Niagara River, about four miles north of the great cataract. The university owns 300 acres; numbers about 200 students, 60 of whom are in the seminary, and has a faculty of 20. Its library contains 13,000 volumes. The grounds and buildings have a value of over $500,000. The institution was incorporated under the title of the College and Seminary of Our Lady of Angels by an act of the legislature of the State of New York in 1863, and in 1883 it was erected into a university with full powers and authority under the present title of Niagara University, by the regents of the State of New York.

Saint John's Ecclesiastical Seminary for the Boston archdiocese, located at Brighton, a charming suburb, and now under direction of diocesan clergy, was placed by its founder, Archbishop Williams, under the direction of Sulpician Fathers, assisted here, as in Baltimore and New York, by professors taken from the ranks of the diocesan clergy. In the two departments, philosophical and theological, there are 12 professors and 100 students.

There are about 85 seminaries in the United States, wherein 4,000 diocesan students and members of religious communities are trained for the priesthood. In Europe two institutions are maintained by the American bishops for the training of American students, the American College in Rome, and another at Louvain.

CATHOLIC SUMMER SCHOOL OF AMERICA, a school for higher education established by the Roman Catholics at Plattsburg, N. Y., on Lake Champlain. It was organized in 1892, and met at various places before the present site was decided upon. In 1893 the regents of the University of the State of New York granted a charter by which this school became a legal corporation, and was classified in the system of public instruction devoted to university extension. By this charter certain advantages are acquired by summer-school students who wish to prepare for the regents' or State examinations. The object of the school is to increase facilities for those who wish to pursue lines of study in various departments of knowledge. Opportunities for instruction are provided by lectures from eminent specialists. Courses are given in philosophy, anthropology, history, literature, ethics, science, pedagogy, sociology and religion. The school is beautifully located, and though not far from the principal summer hotel on Lake Champlain, has its own cottage accommodations, a club or casino for social reunions, its lecture halls and local book store. The place is an ideal summer resort and attracts many friends of education, both Roman Catholic and Protestant, during the school season.

Another summer school, the Columbian Catholic Summer School, assembled at Madison, Wis., in July 1898, with lecturers from Washington, D. C., and other centres of educational work. In 1901 it removed to Saint Paul, Minn., and adopted the name of the American Catholic Chautauqua.

CATHOLIC TOTAL ABSTINENCE UNION OF AMERICA, a confederation of all the Catholic total abstinence organizations in this country. It believes that the virtue of temperance is a religious virtue, to be cultivated by religious methods. The membership, amounting in the year 1910 to nearly 100,000, includes women's and juvenile organizations, as well as men's societies. While the Union urges men to become total abstainers, it does not hold that drink is an evil in itself, or that the use of it is wrong, but that the use of it is for many the proximate occasion of sin; and that by such persons drink should be abandoned altogether. It does not assert that all goodness and virtue are in total abstinence, but it does hold that total abstinence is a powerful preventive of social disorder and sin. The office of the general secretary of the Union is in the house of the Paulist Fathers in New York. The Union publishes for circulation numerous pamphlets on the subject of total abstinence.

CATHOLIC UNIVERSITY OF AMERICA, The, an institution for higher education maintained by the Catholic Church in the United States and located at Washington, D. C. The need of a university in which instruction should be given and research conducted in all the departments of knowledge, under Catholic auspices, was recognized by the bishops assembled in the Second Plenary Council of Baltimore (1866); and the establishment of such an institution was resolved upon in the Third Plenary Council (1884). Pope Leo XIII in 1887 approved the project and granted the pontifical charter by the Apostolic Letter «Magni nobis gaudii» of 7 March 1889. The university was incorporated under the laws of the District of Columbia, and the city of Washington was selected as the site. The first endowment ($300,000) was contributed by Miss Mary Gwendoline Caldwell of Newport, R. I. The Rt. Rev. John J. Keane, then bishop of Richmond, Va., was designated as rector of the university. In November 1889, academic work was inaugurated in the School of the Sacred Sciences. The Schools of Philosophy and Social Science were opened in 1895 and their departments were subsequently reorganized in the Schools of Law, Philosophy, Letters and Sciences.

The «organic law» of the university is embodied in the constitution, which was approved by the Holy See in 1889. It provides that the bishops of the United States shall have plenary authority in all matters pertaining to organization, instruction or discipline. This authority is exercised by a board of trustees composed of bishops, priests and laymen, who may elect new members and fill vacancies in the board. The chancellor, as the representative of the Holy See, presides at the meetings of the trustees. Subject to the authority of the trustees, the immediate government of the university is placed in the hands of the rector, assisted by the academic senate. The ex officio members of the senate are the rector, the vice-rector, the general secretary, the deans of the faculties and the presidents of university colleges. In addition, each faculty elects two delegates to serve in the senate for two years.

The senate acting with the rector has competency in matters pertaining to the methods of instruction, the appointment of associate professors and examinations for degrees. It proposes to the board of trustees such measures as may seem advantageous for the development of the university and it recommends to

the chancellor successful candidates for degrees.

The work of each school is in charge of a faculty composed of professors appointed by the board of trustees. The school comprises various departments in which courses are given by professors, associate professors, instructors and occasional lecturers. The faculty elects its officers — dean, vice-dean and secretary — and two delegates to the senate. It has a consultative voice in regard to the appointment or removal of professors, and, subject to the decision of the senate, draws up or revises courses of study, examines candidates for degrees and makes recommendations for the development of the school. The teaching staff for 1916–17 includes 32 priests and 47 laymen.

The revenues of the university are derived from endowments, donations for special purposes, tuition fees and annual collections taken up in each diocese of the United States. A detailed statement of the receipts and expenditure is published yearly in the rector's report. In 1916 there were 20 endowed chairs, 4 fellowships, 37 scholarships and 50 graduate scholarships, the last named being the foundation of the Knights of Columbus (1914). The terms of award of these endowments for the assistance of students are published in the 'Year-Book' of the university.

The student body includes clerics and laymen, the former representing the diocesan clergy and the religious orders. According to the registration lists for 1916–17, the university enrolled 564 students, 131 clerics, 429 lay.

The courses offered by the School of the Sacred Sciences are for graduates only, i.e., for students who have completed both their collegiate studies and the usual course (five years) of the theological seminary. In other schools, some of the courses are for graduates only, but most of them are open to undergraduates, i.e., to students who have completed a four years' high school course. Students who apply for admission without certificate of previous study must take an examination in accordance with the requirements of the college entrance examination board.

Grouped about the university are the houses of study of the religious orders: the Paulists, Marists, Fathers of the Holy Cross, Franciscans, Sulpicians, Dominicans, Brothers of Mary, Carmelites, Oblates and Missionaries of Divine Love. Each order maintains a college which is open only to members of the order, and in which courses of instruction are given with special reference to the needs of the students and their training as religious. For advanced courses these students attend the university. Other institutions affiliated with the university are the Saint Paul Seminary, Saint Paul, Minn.; the Institute of Scientific Study, New York city; Mount Saint Mary's Seminary of the West, Cincinnati, Ohio; and the Apostolic Mission House, Washington, D. C.

The Catholic Sisters College (50 students), established in 1911, receives only members of female religious communities who desire to prepare for the work of teaching. The courses of instruction are given by professors from the university and the requirements for degrees are the same as those prescribed for candidates within the university.

Trinity College (256 students), founded in 1897, has for its purpose the higher education of women. It is conducted by the Sisters of Notre Dame of Namur and is affiliated with the university, some of the courses being given by university instructors.

Since 1911 summer courses have been given by the university at Washington and since 1914 at Dubuque, Iowa. They are followed by members of the teaching communities and by lay teachers, the average attendance being 600.

In 1912 the university adopted a plan for the affiliation of colleges and high schools. The course of study in the affiliated institution must be approved by the university which also sets the examination. At present 10 colleges and 112 high schools are affiliated.

The publications that issue from the university are: *The Catholic University Bulletin; The Catholic Educational Review; The Corpus Scriptorum Christianorum Orientalium; The Catholic Historical Review* and *The Catholic Charities Review.*

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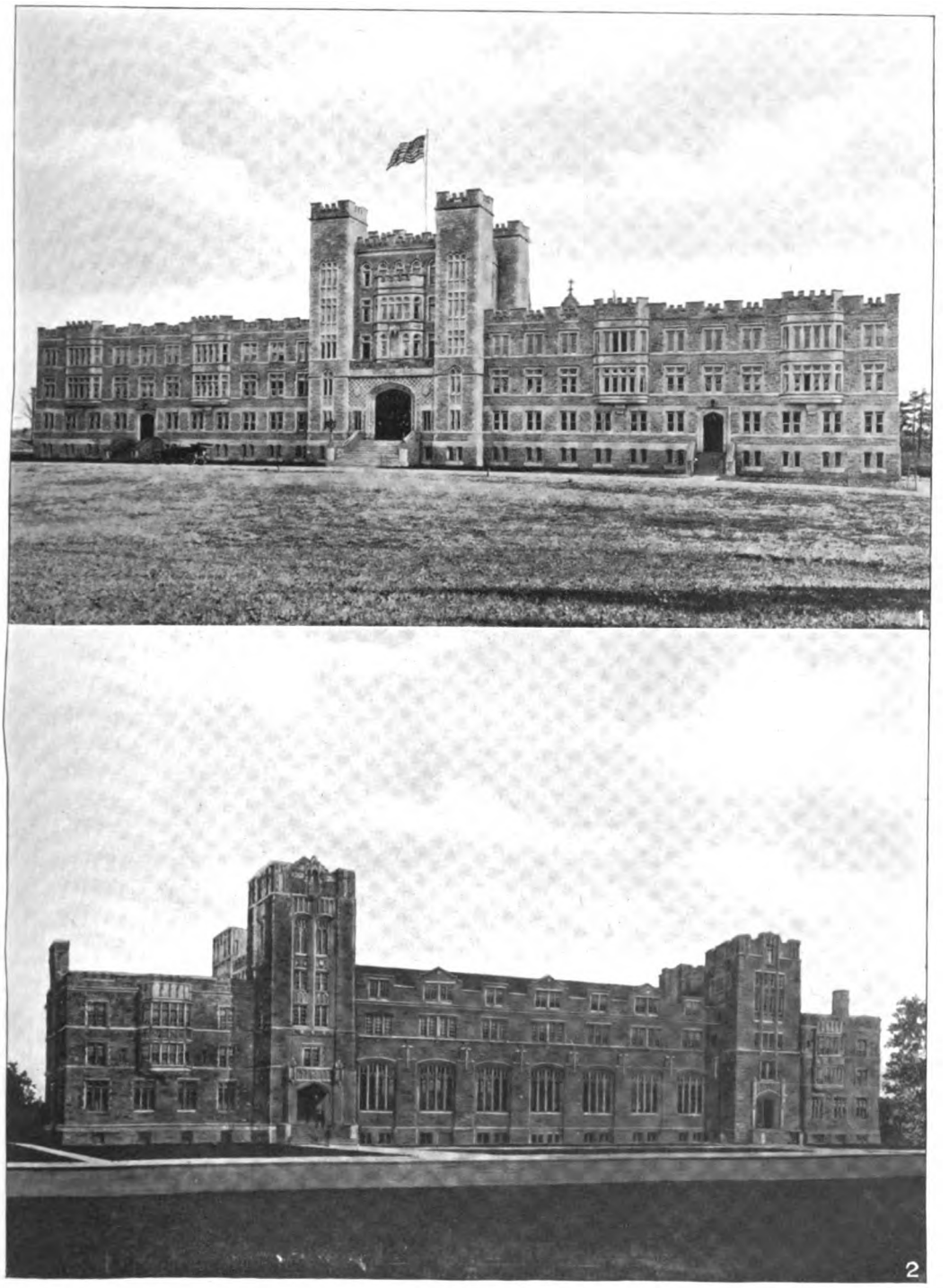
EDWARD A. PACE,
Professor of Philosophy, Catholic University of America.

CATHOLIC YOUNG MEN'S NATIONAL UNION, an association organized in 1875, for the furtherance of lay Roman Catholic unity and the moral advancement of its members. The means relied on for accomplishing its object are practical fulfilment by the individual members of the obligations imposed by their religion; fraternal union of all associations that aim in any way at the spiritual, intellectual and moral improvement of Catholic young men, and the privilege assured to each member of being received as a guest by any society in the Union, or as a member by transfer. The Third Plenary Council of the Roman Catholic Church of the United States, held at Baltimore, thus expressed approval of the Union in its pastoral letter: "In order to acknowledge the great amount of good that the C. Y. M. N. U. has already accomplished . . . we cordially bless their aims and endeavors, and we recommend the Union to all Roman Catholic young men." With this association originated in 1892 the successful summer school session now annually held at Cliff Haven, on the shores of Lake Champlain, near Plattsburg, N. Y.

CATHREIN, kā-trīn', **Victor,** Swiss Jesuit writer and sociologist: b. Brig, Canton Wallis, Switzerland, 8 May 1845. He was educated at the Brig gymnasium and at various Jesuit scholasticates. He entered the Society of Jesus in 1863 and in 1867–69 was professor of German at the Belgian colleges of Antwerp and Verviers. During the Franco-Prussian

CATHOLIC UNIVERSITY OF AMERICA



1 Cardinal Gibbons Memorial Hall

2 Graduate Hall

War of 1870–71 he was engaged in caring for wounded French soldiers at Coblenz. In 1872 he was expelled from Germany by law against the Jesuits, and was ordained to the priesthood in 1877. From 1879 to 1882 he was on the staff of *Stimmen aus Maria-Laach*, and from 1882 to 1912 was successively professor of ethics at the Jesuit scholasticates of Blyenbeck Exaten and Valkenburg, Holland. He wrote 'Die englische Verfassung' (1881); 'Die Aufgaben der Staatsgewalt und ihre Grenzen' (1882; 10th ed., 1915); 'Die Sittenlehre des Darwinismus; eine Kritik der Ethik Herbert Spencers' (1885); 'Moralphilosophie' (2 vols., 1891; 5th ed., 1911); 'Der Sozialismus' (1890; 10th ed., 1910); 'Das Privatgrundeigentum und seine Gegner' (1892; 4th ed., 1909); 'Philosophia moralis in usum scholarum' (1893; 10th ed., 1915); 'Kirche unde Volksschule' (1896); 'Durch Atheismus zum Anarchismus' (1895; 2d ed., 1900); 'Recht, Naturrecht und positives Recht' (1900; 1909); 'Glauben und Wissen' (1901; 5th ed., 1911); 'Die Grundbegriffe des Strafrechts' (1905); 'Die Frauenfrage' (1901; 3d ed., 1900); 'Religion und Moral, oder gibt es eine Moral ohne Gott?' (1902; 2d ed., 1904); 'Die katholische Weltanschauung' (4th ed., 1914), and contributions to periodicals.

CATILINE (LUCIUS SERGIUS CATILINA), Roman statesman: b. about 108 B.C.; d. Pistoia 5 Jan. 62 B.C. Of patrician birth, but poor, he attached himself to the cause of Sulla, had some share in his success, and still more in his proscriptions. Murder, rapine and conflagration were the first deeds and pleasures of his youth. He appears to have served in the army with reputation. Sallust, who has written the history of his conspiracy, describes him as having a constitution that could support hunger, cold, fatigue and want of sleep, to almost any limit; with a spirit bold, cunning, fruitful in resources; lusting after the wealth of others, prodigal of his own; a man of fiery passions, but limited judgment. Such was his art, that, while poisoning the minds of the Roman youth, he gained the friendship and esteem of the severe Cato. Equally well qualified to deceive the good, to intimidate the weak and to infuse his own boldness into his associates, he evaded two accusations brought against him by Clodius for criminal intercourse with a vestal, and for monstrous extortions, of which he had been guilty while proconsul in Africa. A confederacy having been formed of many young men of high birth and daring character, who saw no other means of extricating themselves from their enormous debts than by obtaining the highest offices of the state, Catiline was placed at their head. This eminence he owed chiefly to his connection with the old soldiers of Sulla, by means of whom he kept in awe the towns near Rome, and even Rome itself. At the same time he numbered among his adherents not only the worst and lowest of the populace, but also many of the patricians and men of consular rank. Everything favored the audacious scheme. Pompey was pursuing the victories which Lucullus had prepared for him; and the latter was but a feeble supporter of the patriots in the Senate, who wished him, but in vain, to put himself at their head. Crassus, who had delivered Italy from the gladiators, was now striving after power and riches, and countenanced the growing influence of Catiline as a means of his own aggrandizement. Cæsar, who was laboring to revive the party of Marius, spared Catiline, and perhaps even encouraged him. Only two Romans remained determined to uphold their falling country — Cato and Cicero; the latter of whom alone possessed the qualifications necessary for the task. The conspirators were now planning the elevation of Catiline and one of his accomplices to the consulship, by which they hoped to obtain possession of the public treasures and the property of the citizens under various pretexts, and especially by means of proscription. Cicero had the courage to stand candidate for the consulship; neither insults nor threats, nor even riots and attempts to assassinate him, deterred him from his purpose; and being supported by the rich citizens, he gained his election, 65 B.C. All that the party of Catiline could accomplish was the election of Antonius, one of their accomplices, as colleague of Cicero. This failure, however, did not deprive Catiline of the hope of gaining the consulship the following year. For this purpose he revived the kind of terrorism by which he had laid the foundation of his power. Meanwhile, he had lost some of the most important members of his conspiracy. Antony had been prevailed upon or compelled by Cicero to remain neutral. Cæsar and Crassus had resolved to do the same. Piso had been killed in Spain. Italy, however, was destitute of troops. The veterans of Sulla only waited the signal to take up arms. The signal was now given by Catiline. The centurion Manlius appeared among them, and formed a camp in Etruria. Cicero was on the watch: a fortunate accident disclosed to him the counsels of the conspirators. One of them, Curius, was on intimate terms with a woman of doubtful reputation, Fulvia by name, and had acquainted her with their plans. Through this woman Cicero learned that L. Vargunteius, a senator, and C. Cornelius, a knight, had undertaken to assassinate him at his house. On the day which they had fixed for the execution of their plan, they found the doors barred and guarded. Still Cicero delayed to make public the circumstances of a conspiracy, the progress and resources of which he wished first to ascertain. He contented himself with warning his fellow citizens, in general terms, of the impending danger. But when the insurrection of Manlius was made known, he obtained from the Senate the decree, only promulgated on occasions of the utmost importance, that "the consuls should take care that the republic receive no detriment." It was exceedingly difficult to seize the person of one who had soldiers at his command both in and out of Rome; still more difficult would it be to prove his guilt before judges who were accomplices with him, or at least were willing to make use of his plans to serve their own interest. Cicero had to choose between two evils — a revolution within the city, or a civil war: he preferred the latter. Catiline had the boldness to take his seat in the Senate known as he was to be the enemy of the Roman state. Cicero then rose and delivered that bold oration against him, beginning, *Quo usque tandem abutere, Catilina, patientia nostra?* ("How long, then, Catiline, wilt thou abuse our patience?") Assuming a confidence he did not possess, he attempted a reply, but his

words were instantly drowned by the cries of "Parricide!" and "Traitor!" which rose on all hands. Now fully conscious that his plans were discovered, he rushed from the assembly with threats and curses on his lips, and left Rome at dead of night. The conspirators who remained, Lentulus Sura, Cethegus and other infamous senators, engaged to head the insurrection in Rome as soon as Catiline appeared at the gates. According to Cicero and Sallust, it was the intention of the conspirators to set the city on fire, and massacre the inhabitants. Lentulus, Cethegus and the other conspirators, in the meanwhile, were carrying on their criminal plots. They applied to the ambassadors of the Allobroges to transfer the war to the frontier of Italy itself. These, however, revealed the plot, and their disclosures led to others still more important. The correspondence of the conspirators with their leader was intercepted. As the circumstances of the case did not allow of a minute observance of forms in the proceedings against the conspirators, the laws relating thereto were disregarded, as had been done in former instances of less pressing danger. Cæsar spoke against immediate execution, but Cicero and Cato prevailed. Five of the conspirators were put to death. Caius Antonius was then appointed to march against Catiline, but on the pretext of ill health, gave the command to his lieutenant, Petreius. He succeeded in enclosing Catiline, who, seeing no way of escape, resolved to die sword in hand. His followers imitated his example. The battle was fought with bitter desperation. The insurgents all fell on the spot which their leader had assigned them, and Catiline at their head. Consult Sallust, 'Bellum Catilinarium'; Cicero, 'Orationes in Catilinam'; Rose, 'History of Catiline's Conspiracy' (1813); the biographies of Cæsar and Cicero in Plutarch's 'Lives,' and Beesley, E. S., 'Catiline as a Party Leader' in *Fortnightly Review* (June 1865).

CATINAT, kä-tē-nä, **Nicolas de,** marshal of France: b. Paris 1637; d. Saint Gratien 1712. He quitted the profession of the law for that of arms, and attracted the notice of Louis XIV at the storming of Lille in 1667, and was promoted. By a number of splendid deeds he gained the esteem and friendship of the great Condé, particularly by his conduct at the battle of Senef. He was sent as lieutenant-general against the Duke of Savoy, gained the battles of Staffardo, 18 Aug. 1690, and of Marsaglia, 4 Oct. 1693, occupied Savoy and part of Piedmont, and was made marshal in 1693. In the conquered countries his humanity and mildness often led him to spare the vanquished, contrary to the express commands of Louvois. In Flanders he displayed the same activity, and took Ath in 1697. In 1701 he received the command of the army of Italy against Prince Eugene; but was straitened by the orders of his court, and was destitute of money and provisions, while Eugene was allowed to act with full liberty. On 6 July he was defeated at Carpi. Equally unfortunate was the battle of Chiari, where Villeroi had the chief command. In spite of his representations the French court would not believe the disasters in Savoy to be owing to the perfidy of the Duke of Savoy, and Catinat was disgraced. From his unalterable calmness and consideration his soldiers called him "le Père la Pensée." Consult his 'Memoirs' (Paris 1819) and the biography by De Broglie (1902).

CATINEAU-LAROCHE, kä-tē-nō lä-rōsh, **Pierre-Marie-Sebastien,** French politician: b. Saint-Brieu, 25 March 1772; d. 22 May 1828. He studied at Poitiers, and to escape the Revolution emigrated to San Domingo, where he pulished a journal, *L'ami de la paix et de l'union.* He was sentenced to death for the opinions which he advocated, but, by the timely assistance of the agents of the king of France, succeeded in escaping to Cape Haytien (then called Cape Français), where he alone of 17 of his countrymen was saved from the subsequent massacre in that city. He now visited the United States and England, and on his return to Paris, in 1797, prepared several dictionaries. His printing office having been destroyed by fire, the government employed him in various public capacities. In 1809 he was appointed secretary-general of the commission houses and sent to Austria; and in 1810 he was made inspector of Illyria. He was made head of the Library Administration Bureau and served as secretary-general of the department of Aisne, prefect; and sub-prefect of Saint-Quentin. Once more he visited the United States, and on his return in 1819, he was commissioned to go to Guiana, to study the climate and resources of that province. His notes on that country appeared in 1822. He became chief of the Bureau of Commerce and of the Colonies (1826) and commissary-general of the interior (1828).

CATLETTSBURG, Ky., city and county-seat of Boyd County, on the Ohio and Big Sandy rivers at their confluence, and on the Chesapeake and Ohio Railroad. It has extensive lumber interests and has flour mills, machine shops, saw mills and wholesale grocery, hardware and shoe warehouses. Pop. 3,520.

CATLIN, George, American traveler and artist: b. Wilkesbarre, Pa., 26 June 1796; d. Jersey City, N. J., 23 Dec. 1872. After practising as a lawyer for two years he set up at Philadelphia as a portrait painter, and in 1832 commenced special studies of the American Indians, residing many years among them both in North and South America. In 1840 he went to Europe, and subsequently introduced three parties of American Indians to European courts. His finely illustrated works are 'Manners, Customs and Condition of the North American Indians' (1857); 'North American Portfolio' (1844); 'Eight Years' Travel in Europe' (1848); 'Last Rambles Among the Indians,' etc. (1868). His 500 portraits from life of American Indians are now in the National Museum at Washington, D. C., constituting what is known as the "Catlin Gallery." About 400 sketches are in the possession of the American Museum of Natural History, New York city. Consult Miner, 'George Catlin, with an Annotated Bibliography of His Writings' (New York 1901); 'My Life Among the Indians' (ed. by M. G. Humphreys, 1909).

CATLINITE (named after Catlin (q.v.), American traveler and artist), a dull red indurated clay. It occurs in Pipestone County, Minn., as a layer about 18 inches thick in quartzite. It has been extensively manu-

factured by the Sioux Indians into pipes and various ornamental objects.

CATNIP, or **CAT-MINT**, a hardy perennial herb (*Nepeta cataria*) of the family *Menthaceæ*. It is a native of the Orient and Europe, and has become distributed in most temperate regions of the globe. It is very common in America in the neighborhood of dwellings. Cats are especially fond of it, rubbing themselves upon it and eating it with evident relish. Like other members of its family, it contains a fragrant volatile oil, for which it is sometimes used in cooking. It grows about two feet tall, bears heart-shaped, velvety, whitish-green leaves, and dense whorls of numerous small, purplish or rosy-white flowers. Catnip is sometimes planted in herbaceous borders to soften the tinting, at the same time heightening the effect with its erect stems. In medicine, catnip tea enjoys great popularity with the laity. It is brewed hot and is very useful in attempts to avert "colds." The heat, volatile oil, and accompanying care that the patient takes are all self-conservative.

CATO, kā'tō, **Dionysius**, the reputed author of the small collection of moral apophthegms known as 'Catonis Disticha de Moribus ad Filium.' Nothing is known of him; but the work, which is apparently in large part a genuine classic, had a high reputation in the Middle Ages.

CATO, Marcus Porcius, THE CENSOR, surnamed PRISCUS, also SAPIENS ("the wise"), and MAJOR ("the elder"), Roman statesman and general: b. near Tusculum 234 B.C.; d. 149 B.C. The modern village of Monte Porzio Catone near Tusculum perpetuates his memory. He inherited from his father, a plebeian, a small estate in the territory of the Sabines, which he cultivated with his own hands. He was a youth at the time of Hannibal's invasion of Italy, and served his first campaign, at the age of 17, under Fabius Maximus, when he besieged Capua. Five years after he fought under the same commander at the siege of Tarentum. After the capture of the city he became acquainted with the Pythagorean, Nearchus, who initiated him into the sublime doctrines of his philosophy, with which, in practice, he was already conversant. After the war was ended Cato returned to his farm. As he was versed in the laws, and a fluent speaker, he went at daybreak to the neighboring towns and acted as counsellor and advocate to those who applied to him. Valerius Flaccus, a noble and powerful Roman, who had an estate in the vicinity, observed the talents and virtue of the youth, conceived an affection for him and persuaded him to remove to Rome, where he promised to assist him with his influence and patronage. A few rich and high-born families then stood at the head of the republic. Cato was poor and unknown; but his eloquence, which some compared to that of Demosthenes, and the integrity and strength of his character, soon drew public attention to him. At the age of 30 he went as military tribune to Sicily. In the following year he was quæstor, at which period there began between him and Scipio a rivalry and hatred which lasted till death. Cato, who had returned to Rome, accused Scipio of extravagance; and, although his rival was acquitted, this zeal in the cause of the public gave Cato a great influence over the people. Five years after, having been already ædile, he was chosen prætor, and obtained the province of Sardinia. His strict moderation, integrity and love of justice were here still more strongly displayed than in Rome. On this island he formed an acquaintance with the poet Ennius, of whom he learned Greek, and whom he took with him to Rome on his return. He was made consul 192 B.C., having his friend Valerius Flaccus for colleague. He opposed with all his power the abolition of the Oppian law, passed in the pressing times of the Second Punic War, forbidding the Roman women to wear more than half an ounce of gold, to dress in garments of various colors or to wear other ornaments; but he was obliged to yield to the eloquence of the tribune Valerius and still more potent female importunities. Soon after, he set out for Spain, which was in a state of rebellion. His first act was to send back to Rome the supplies provided for the army, declaring that the war ought to support the soldiers. He gained several victories with a newly-raised army, reduced the province to submission and returned to Italy, where the honor of a triumph was granted to him. He afterward put himself under the command of the Consul Manlius Acilius, to fight against Antiochus, and to carry on the war in Thessaly. By a bold march he made himself master of the Callidromus, one of the highest peaks of the mountain pass of Thermopylæ, and thus decided the issue of the battle. He brought the intelligence of this victory to Rome, 189 B.C. Five years after, in spite of a powerful faction opposed to him, he obtained the most honorable, and at the same time the most feared, of all the magistracies of Rome, the censorship. He had not canvassed for the office, but had only expressed his willingness to fill it. In compliance with his wishes Valerius Flaccus was chosen his colleague, as the only person qualified to assist him in correcting the public disorders, and restoring the ancient purity of morals. He fulfilled this trust with inflexible rigor; and though his measures brought him some obloquy and opposition, they met, in the end, with the highest applause; and when he resigned his office, it was resolved to erect a statue to him with an honorable inscription. He appears to have been quite indifferent to the honor; and when, before this, some one expressed his wonder that no statue had been erected to him, he answered, "I would rather have it asked why no image has been erected to Cato than why one has." Still he was not void of self-complacency. "Is he a Cato, then?" he was accustomed to say, when he would excuse the errors of another. Cato's political life was a continued warfare. He was continually accusing, and was himself accused with animosity, but was always acquitted. His last public commission was an embassy to Carthage to settle the dispute between the Carthaginians and King Massinissa. It is said that this journey was the original cause of the destruction of Carthage; for Cato was so astonished at the rapid recovery of the city from its losses, that he ever after ended every speech of his with the well-known words, *Præterea censeo Carthaginem esse delendam* ("I am also of opinion that Carthage must be destroyed"). He died

a year after his return. Cato, who was so frugal of the public revenues, was not indifferent to riches. He was rigorously severe toward his slaves, and considered them quite in the light of property. He made every exertion to promote and improve agriculture. He was twice married, and had a son by each of his wives. His conduct as a husband and a father was equally exemplary. He composed a multitude of works, of which the only one extant is 'De Agri Cultura.' Those of which the loss is most to be regretted are his orations, which Cicero mentions in terms of the highest encomium, and his history of the origin of the Roman people, which is frequently quoted by the old historians. Fragments of his orations are to be found in Meyers, 'Oratorum Romanorum Fragmenta' (Zürich 1842); and in Jordan's edition (Leipzig 1860); and Peter, H., 'Historicorum Romanorum Fragmenta' (ib. 1870). Consult Sears, 'History of Oratory' (Chicago 1896). For a translation of 'De Agri Cultura' see 'Roman Farm Management: The Treatises of Cato and Varro done into English, by a Virginia Farmer' (New York 1913).

CATO, Marcus Porcius, called (to distinguish him from the censor, his great grandfather) CATO OF UTICA and CATO THE YOUNGER, Roman patriot: b. Rome 95 B.C.; d. Utica, North Africa, 46 B.C. He formed an intimacy with the Stoic Antipater of Tyre, and maintained through life the principles of the Stoic philosophy. His first appearance in public was against the tribunes of the people, who wished to pull down a basilica erected by the censor, Cato, which was in their way. On this occasion he displayed that powerful eloquence which afterward rendered him so formidable, and won the cause. He served his first campaign as a volunteer in the war against Spartacus, and highly distinguished himself. He served as military tribune in Macedonia in 67 B.C. When his term expired he went to Asia, and brought back the Stoic Athenodorus with him to Rome. He was made quæstor in 65 B.C., and executed his difficult trust with the strictest integrity, while he had the spirit to prosecute the public officers for their acts of extortion and violence. His conduct gained him the admiration and love of the Romans, so that, on the last day of his quæstorship, he was escorted to his house by the whole assembly of the people. The fame of his virtue spread far and wide. In the games of Flora the dancing-girls were not allowed to lay aside their garments as long as Cato was present. The troubles of the state did not permit him to remain in seclusion. The example of Sulla in usurping supreme power was followed by many ambitious men, whose mutual dissensions were all that saved the tottering constitution from immediate ruin. Crassus hoped to purchase the sovereignty with his gold; Pompey expected that it would be voluntarily conferred upon him; and Cæsar united himself to both and made use of the wealth of the one and the reputation of the other to attain his own objects. By keeping aloof from all parties Cato served the Commonwealth with sagacity and courage; but he often injured the cause which he was trying to benefit by the inflexibility of his character. In 63 B.C. he was chosen tribune of the people. About this time the conspiracy of Catiline broke out. Cato supported Cicero, then consul, with all his power, first gave him publicly the name of "father of his country," and urged, in a fine speech preserved by Sallust, the rigorous punishment of the traitors. He opposed the proposition of Metellus Nepos to recall Pompey from Asia, and give him the command against Catiline, and very nearly lost his life in a riot excited against him on this account by his colleague and Cæsar. After the return of Pompey he frustrated many of his ambitious plans, and first predicted the consequences of his union with Crassus and Cæsar. The triumvirate, in order to remove him to a distance, had him sent to Cyprus, of which he took possession on behalf of Rome (58–57). Compelled to obey, he executed his commission with so much address that he enriched the treasury with a larger sum than had ever been deposited in it by any private man. In the meantime he continued his opposition to the triumvirate. Endeavoring to prevent the passage of the Tribonian law, for investing the triumvirs with extraordinary powers, he was drawn into tumults, and even personal conflict. Being made prætor in 54 B.C., he carried into execution a law against bribery that displeased all parties. After the death of Crassus the civil commotions increased, and Cato, as the only means of preventing greater evils, proposed that Pompey should be made sole consul, contrary to the constitution, which proposition was adopted. The year following, 51 B.C., Cato lost the consulship by refusing to employ bribery to procure a majority. In 49 B.C. the civil war broke out. Cato, then proprætor in Sicily, on the arrival of Curio with three of Cæsar's legions, departed for the camp of Pompey at Dyrrachium. He had always hoped to prevent the war by negotiation; and when it broke out he put on mourning in token of his grief. Pompey, having been victorious at Dyrrachium, left Cato behind to guard the military chest and magazine, while he pushed after his rival. For this reason Cato was not present at the battle of Pharsalia, after which he sailed with his troops to Cyrene, Africa. Here he learned that Pompey's father-in-law, Scipio Metellus, had gone to Juba, king of Mauritania, where Varus had collected a considerable force. Cato immediately set off to join him, and after undergoing every hardship reached Utica, where the two armies effected a junction 47 B.C. The soldiers wished him to be their general, but he gave this office to Scipio, and took command in Utica, while Scipio and Labienus marched out against Cæsar. Cato had advised them to protract the war, but they ventured an engagement, in which they were defeated, and Africa submitted to the victor. Cato had at first determined to defend himself to the last, with the senators in the place, but abandoned this plan, and despairing of the Commonwealth, and unwilling to live under the despotism of Cæsar, resolved to die. On the evening before the day which he had fixed upon for executing his resolution, he took a tranquil meal, and discussed various philosophical subjects. He then retired to his chamber and read the 'Phædo' of Plato. Anticipating his intentions, his friends had taken away his sword. He sent for it, and in spite of the tears and entreaties of his friends persisted in his

purpose, advised those present to submit to Cæsar, and dismissed all but the philosophers Demetrius and Apollonius, whom he asked if they knew any way by which he could continue to live without being false to his principles. Weeping silently they left him. He then received his sword joyfully, again read 'Phædo,' made calm inquiries for departing friends, slept awhile, and when left alone stabbed himself. His people rushed in, and finding him in a swoon bound up his wounds; but, on coming to himself, he tore off the bandages and expired. The Uticans buried him honorably, and erected a statue to him. Cæsar, when he heard the news of his death, exclaimed, "I grudge thee thy death, since thou hast grudged me the honor of sparing thy life."

CATO, the title of two noted 18th century plays: (1) A blank verse tragedy by Joseph Addison in five acts. It was first presented in 1713. The scene is laid in a hall of the governor's palace at Utica. The subject is Cato's last desperate struggle against Cæsar, and his determination to die rather than survive his country's freedom. 'Cato' owned its extraordinary success to the deadly hatred that raged between the Whigs and Tories at the time: the Whigs cheered when an actor mentioned the word "liberty"; and the Tories, resenting the implied innuendo, cheered louder than they. To the Whigs Marlborough was a Cato, to the Tories he was a Cæsar. Every poet of the time wrote verses in honor of 'Cato,' the best being Pope's prologue; and it was translated into French, German and Italian. (2) A tragedy by Metastasio, 1727. The author follows closely the historic accounts of Cato's relations with Cæsar, and the details have more probability than those of Addison. He shows a decided superiority to Addison in making Cæsar the principal figure next to Cato, and placing them constantly in contrast with each other.

CATO STREET CONSPIRACY, or **THISTLEWOOD CONSPIRACY**, in English history, a plot formed in 1820 to murder the Foreign Secretary, Lord Castlereagh and other Cabinet Ministers, and to form a provisional government. The leader of the conspirators was Arthur Thistlewood. The plot was discovered and several of the conspirators captured, on 23 February, when they had assembled in a stable on Cato street and were preparing to carry out their intentions. Thistlewood, who escaped, was arrested the next day. After a trial in which they were defended by John Adolphus, Thistlewood and four others were executed, and five were transported.

CATOCALA, a genus of nocteiid moths, represented by more than 100 species in North America, and many in the Old World. See UNDERWING.

CATON, John Dean, American lawyer and author: b. Monroe, N. Y., 1812; d. 1895. From 1855 to 1864 he was chief justice of Illinois. He has traveled extensively in Europe, China and Japan and published 'A Summer in Norway' (1875); 'The Last of the Illinois and a Sketch of the Pottawattomis' (1876); 'The Antelope and Deer of America' (1877).

CATOPTRICS, that branch of optics which explains the properties of incident and reflected light, and particularly that which is reflected from mirrors or polished surfaces. The whole doctrine of catoptrics rests on the principle that the angle of incidence is equal to the angle of reflection and in the same plane.

CATOPTROMANCY, a species of divination practised by the Greeks, in which a mirror was let down by a cord into a fountain in the temple of Ceres, in Achaia, into which sick persons looked. If the observer's face appeared in it sickly or ghastly the omen was considered unfavorable, and the sick person would not recover; but if, on the other hand, it appeared fresh and healthy, the omen was considered favorable. The superstition that seven years of bad luck will follow the breaking of a mirror or that if a young lady looked in the mirrow by candle light on Hallowe'en she would see the face of her lover are evidently survivals of this old form.

CATORCE, kä-tôr'thā, or ka-tôr'sā, Mexico, mining town of San Luis Potosí, which received its name, signifying 14, from a gang of robbers, formerly a constant menace to its inhabitants. It is situated in a barren district 8,700 feet above sea-level and 108 miles north of San Luis Potosí by rail. The town lies at the foot of a mountain 10,000 feet high. It contains valuable silver mines discovered in 1773, now pretty well worked out. The ore is mixed with sulphur, and requires treatment by a high degree of heat. When the French invaded Mexico, a mint was started here, and worked until 1867. The amount coined was about $52,000,000. The population is variable, ranging from 10,000 to 18,000, according to the state of mining.

CATOSTOMIDÆ, a family of fishes of the order *Plectospondyli* (q.v.), or, in a more limited sense, of the *Eventognathi*. They have the first four vertebræ coalesced and partly converted into a chain of bones reaching from the swim-bladder to the internal ear; the lower pharyngeal bones elongated and falcate, and bearing a row of numerous comb-like teeth; the jaws toothless and formed in part by the maxillary bone; the mouth usually small with thick protractile lips; the form more or less elongate and rounded or slightly compressed; and the fins soft, rayed with no adipose (rayless) dorsal fin. An extensive family of fresh-water fishes, chiefly of North America, where 12 or 14 genera and more than 60 species occur; in addition to which a very few are found in eastern Asia. Although abundant almost everywhere in the United States, none of the species have more than a local value as food fishes. To the *Catostomidæ* belong the suckers, buffalo-fishes, horse-fishes, certain so-called mullets, etc. (qq.v.).

CATRAIL (also known as the PICTS' WORK or PICTS' WORK DITCH), the name applied to the remains of a large earthwork in Scotland, about 50 miles in length, which, beginning at Torwoodlee Hill, near the junction of the Gala Water with the Tweed, runs with a semi-circular sweep southward through the counties of Selkirk and Roxburgh to a point under Peel Fell, in the Cheviots. The earthwork consisted of a deep ditch, with a rampart on each side, and varied in breadth from 20 to 26 feet. Various causes have resulted in the destruction of the ramparts in many places. The origin of the Catrail has led to much

speculation, but is now supposed to have been a line of defense raised by the Britons against the invading Saxons.

CATS, käts, **Jakob,** Dutch poet: b. Brouwershaven, Zealand, 10 Nov. 1577; d. Zorgvliet, near Scheveningen, 12 Sept. 1660. He studied at Leyden, Orleans and Paris. In 1627 and 1631 he was Ambassador to England, and in 1636 grand pensioner of Holland. His poetry is unimaginative and didactic, but has been extremely popular with the Dutch middle class by whom he is frequently affectionately alluded to as "Father Cats." A statue has been erected to him at his birthplace. His works consist of allegories, according to the taste of his times, poems on the different ages and situations of life, idyls, etc. Among the most noted are 'Het Houwelyck' (Marriage) (1625); 'Sinneen-Minnebeelden' (1618); 'Trouringh' (1637); 'Maechdenplicht' (1618); 'Selfstryst' (1620); 'Spiegel van den ouden en nieuwen tydt' (1632); 'Faces Agustae' (1653). Consult Derudder, G., 'Un poète néerlandais'; 'Cats, sa vie et ses œuvres' (Hague 1899).

CAT'S-EYE, the name given to several hard semi-transparent stones used as gems, which, when cut in a certain way, show a line of light giving what is called a *chatoyant* effect. The true cat's-eye is a chrysoberyl of a greenish color, found in Ceylon and Brazil. The line of light shown when the stone is cut *en cabochon* is due to the structure of the crystal, or to included impurities. The common cat's-eye, of little value, is a crystalline quartz sometimes containing fibres of asbestos, which, cut across the fibres, gives a *chatoyant* effect. It is found in Bavaria. Tiger-eye (q.v.) also shows the chatoyancy of the cat's-eye. Beautiful tourmaline cat's-eyes, rivaling the Oriental stones, have recently been found in California. Stones exhibiting the cat's-eye ray have been cut from various other minerals, including beryl, corundum, fibrous hornblende, bronzite and hypersthene.

CATSKILL, N. Y., village and county-seat of Greene County, 30 miles southeast of Albany, on the west side of the Hudson River and on the West Shore and the Catskill Mountain railroads, also connected with the New York Central by a ferry crossing the Hudson. It is connected by steamboat lines with New York and Albany. The village, frequented as a summer resort, though important rather as the point of departure for the more popular mountain resorts, has a courthouse, opera-house, free academy and public library. It manufactures woolens, hosiery, cut glass, bricks, etc., and is in a productive fruit-growing region. Catskill was settled about 1680 by Derrick Teunis Van Vechten. The village owns its waterworks. Pop. (1910) 5,296.

CATSKILL AQUEDUCT. See AQUEDUCTS.

CATSKILL GROUP, a name given to a great thickness of red, brown, green and gray conglomerates, sandstones and shales of which the Catskill Mountains are composed. Being well exposed by numerous cliffs and gorges, these deposits were carefully studied by the New York Geological Survey some 50 years ago. The rocks were believed to constitute a series, having a definite place in the classification of the Palæozoic rocks worked out by the Survey, and were given the name Catskill. Subsequent investigation has shown that the Catskill is not even to be called a group. It is simply a succession of shoal-water deposits of Upper Devonian Age, that were laid down along one shore of an interior sea, while normal marine sediments, now represented by limestones, were being laid down elsewhere. Thus is happens that the Lower Catskill, of the Catskill Mountains, is represented elsewhere by limestones of the Hamilton stage, the Middle Catskill by the Portage and the Upper Catskill by the Chemung. In the Catskill Mountains the so-called Catskill series is 4,500 feet thick; and where thickest, at Mauch Chunk, Pa., it is 7,500 feet thick. Farther south the rocks thin out and disappear altogether in Virginia. Though having no standing as a rock group, the Catskill is of interest from its many resemblances to the Old Red Sandstone of England, made famous by Hugh Miller, and is of economic importance from containing some beds of excellent flags, quarried at numerous openings in Ulster, Greene and Delaware counties, N. Y., and sold as Hudson River bluestone. See DEVONIAN; OLD RED SANDSTONE.

CATSKILL MOUNTAINS, a group of moderate elevation, part of the Alleghany Plateau, lying to the west of the Hudson River and situated mainly in Greene and Ulster counties, N. Y. The system covers about 1,400 square miles. The geological formation is very old, the mountains consisting of the shales and sandstone of the Catskill group of the Devonian system. The group contains several summits between 3,000 and 4,000 feet above sea-level. Slide Mountain, 4,204 feet; Hunter Mountain, 4,025 feet, are the highest. The low lands along the creeks which drain the mountains and some uplands are cultivated. Many of the slopes form fine pastures; but the greater part is forested thickly with oak, ash, maple, beech, pine, hickory, etc. The pure atmosphere attracts summer visitors in large numbers, and the region is dotted with many hostelries. Railways give access to many parts of the region, and several points can be reached by boats. There are several pretty cascades in the gorges, known here by their Dutch name, cloves. Within recent years part of the Catskill watershed is being utilized as a water supply source for New York city.

CATT, Carrie Lane Chapman, American suffrage reformer: b. Ripon, Wis. She was educated at the State Industrial College of Iowa and subsequently studied law. She was for three years principal of the High School at Mason City, Iowa, and in 1884 was married to Leo Chapman, editor of the Mason City *Republican,* who died some two years later. In 1891 she was married to G. W. Catt (q.v.). Since 1890 she has devoted herself to woman suffrage work, lecturing in every State, and also in most of the countries of Europe. In 1904 she was elected president of the International Woman Suffrage Alliance and still holds that office, and in 1915 elected president of the National American Woman Suffrage Association.

CATT, George William, American engineer: b. Davenport, Iowa, 9 March 1860; d.

CATSKILL SCENERY

BIG INDIAN VALLEY

ENTRANCE TO THE PLAATERSKILL CLOVE

1905. He was educated at the Iowa State College and subsequently studied engineering and law. He was chief engineer of the San Francisco Bridge Company, 1887–92; president and engineer of the New York Dredging Company, 1893–99; and president and engineer of the Atlantic Gulf & Pacific Company from 1899. He has built government dry docks at the navy yards at League Island, Philadelphia, and Mare Island, Cal.

CATTARO, kät'tä-rō, Austria, a seaport in Dalmatia, at the foot of the Gulf of Cattaro, on the east side of the Adriatic, 38 miles southeast of Ragusa. It lies at the foot of steep limestone rocks, strongly fortified and surmounted by a castle, and is surrounded with walls. The buildings are in the Venetian style, and the streets are narrow, irregular and dark. It is the seat of a Roman Catholic bishop, and the cathedral is a well-built edifice. The harbor is spacious. The chief trade is with Montenegro. Once a Roman colony, it became part of the republic of Venice in 1420; passed to Austria in 1797; was conquered by Italy 1805; restored to Austria 1814. Two earthquakes wrought considerable destruction in the town. Pop. about 6,000.

CATTEGAT, or **KATTEGAT,** a gulf of the North Sea, between North Jutland to the west, Sweden to the east, and the Danish islands of Zealand, Funen, etc., to the south; and by joining the Skagerrak on the west and the Little and Great Belts and the Sound on the east, forming the middle link in the chain of waters connecting the Baltic with the North Sea. It is about 150 miles from north to south; its greatest breadth about 90. It is difficult of navigation, being not only shallow toward the shores, and irregular in depth, but obstructed by several sand-banks, and the adverse winds which often prevail here increase the danger. The Cattegat is noted for its herring-fishery. It contains the islands Samsöe, Anholt, Lessöe and Hertzholm.

CATTELL, Henry Ware, American pathologist: b. Harrisburg, Pa., 7 Oct. 1862. After studies at Lafayette College and at the universities of Leipzig, Pennsylvania and Freiburg (Baden), he was appointed demonstrator of morbid anatomy at the University of Pennsylvania 1892–97, and director of the Ayer Chemical Laboratory in the Pennsylvania hospital. He was consulting pathologist to numerous Philadelphia hospitals and professional expert in several criminal cases. Besides editing the *International Medical Magazine* (1894–97); *International Clinics* (1900–03) and again after 1910; *Medical Notes and Queries* (after 1905); 'Lippincott's Medical Dictionary' (1910; 3d ed., 1913), he translated Ziegler's 'Special Pathological Anatomy' (1899–97). His published works include 'Notes on Demonstrations in Morbid Anatomy' (1899–1901); 'Post Mortem Pathology' (1903; 3d ed., 1906); '606' (1910).

CATTELL, James McKeen, American psychologist: b. Easton, Pa., 25 May 1860. He was graduated at Lafayette College in 1880, and studied at Leipzig, Paris, Geneva and Göttingen. He was assistant under Wundt at the University of Leipzig, professor of pyschology in the University of Pennsylvania in 1888–91 and professor of experimental psychology in Columbia University 1891–96; from 1896 to 1902 head of the department of anthropology, and from 1902 to 1905 professor in the department of philosophy. He resigned in 1917. He is coeditor of the *Psychological Review* and *Science,* and *The American Naturalist.*

CATTERMOLE, George, English water color painter: b. Dickleborough, near Diss, Norfolk, 8 Aug. 1800; d. Clapham, Surrey, 24 July 1868. Like Turner and William Hunt, he started in life as a topographical draughtsman, and was employed as a draughtsman on Britton's 'English Cathedrals' when only 16. He drew the designs for the illustrations of various annuals, the Waverley Novels, for an edition of Shakespeare, and for his brother's 'History of the Civil Wars.' In 1833 he was elected a member of the Society of Painters in Water Colors. He was a member also of the Academy at Amsterdam, and of the Belgian Society of Water Color Painters. He obtained a medal of the first class at the Paris Exhibition of 1855. In 1851 he resigned his membership of the English Society, and devoted himself to oil painting. Cattermole is one of the most important representatives of the Romantic movement in English art. Among the best known of his pictures are 'Hamilton of Bothwellhaugh about to Shoot the Regent Murray'; 'Luther at the Diet of Spires'; 'The Armorer's Tale'; 'A Terrible Secret,' etc.

CATTI, or **CHATTI,** one of the most renowned and valiant of ancient German tribes, inhabiting what is now Hesse, also part of Franconia and Westphalia. They carried on bloody wars with the Hermunduri and Cherusci. In the time of Cæsar they dwelt on the Lahn, and opposed him with effect. Drusus defeated without reducing them. In the reign of Marcus Aurelius they made incursions into Germany and Thrace, but were afterward defeated by Didius Julianus. In 392 they made their last appearance in history in union with the Franks. According to Cæsar, their territory was divided into 100 districts, each of which was obliged to send annually 1,000 men into the field, whose place was supplied the following year by those who had before remained at home to cultivate the ground. Their food was milk, cheese and game; their dress the skins of animals. Their limited princes, who governed in connection with a diet, annually distributed the lands among the families.

CATTLE. Cattle comes from the old French word *catel,* which is derived from the Mediæval Latin *capitale* or *capitale,* meaning goods or property. The use of the English word *cattle* ordinarily refers to a group of animals related to the ox or cow, although on occasion it has been applied to all the larger animals of economic value. The present Latin designation for cattle, *bos taurus,* was given by Linnæus the Swedish naturalist, but as *taurus* means bull, this word is unsatisfactory if it is desired to refer to the female, the cow, or to the unsexed male, the steer. The English word ox is traced through several languages to the words *urox, aurochs* or *auerochs,* names given the prehistoric ox. This word ox (plural oxen) has been very widely used in reference

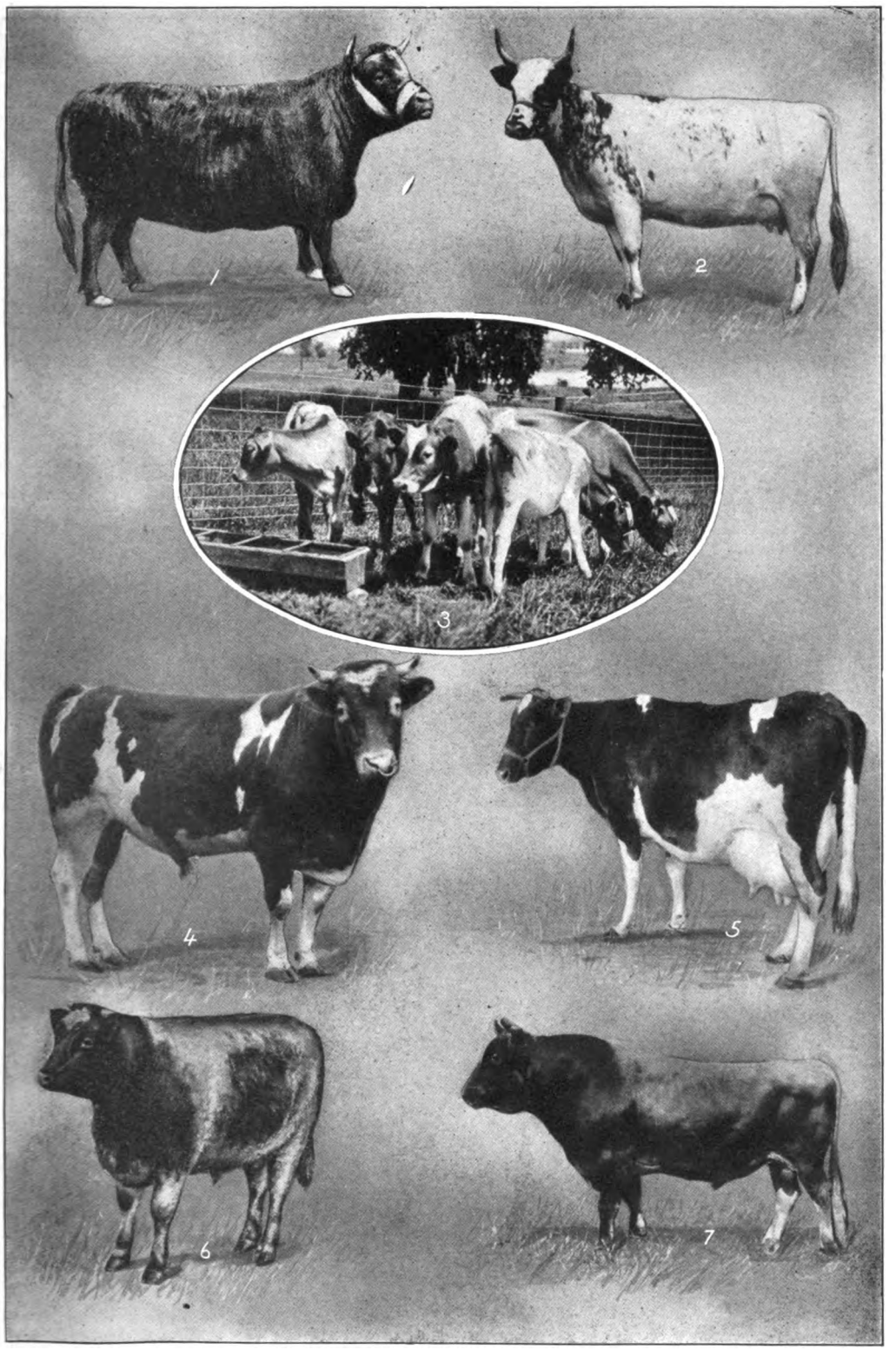
to cattle, though not entirely satisfactory in its application.

Cattle existed in prehistoric times, and their remains have been extensively found in the more recent geological periods. Wild oxen were hunted in Great Britain and on the continent of Europe, and parts of skeletons have been found in which were embedded flint spear heads. The prehistoric ox, known as *Bos taurus primigeneus*, varied in size in a marked degree, but as commonly found was much larger than the ox of the present day. A complete skeleton of what has been termed *Bos taurus giganteus* has been recovered from the English fen lands, and many parts of large skeletons may be seen in British museums. There are to-day in England and Scotland a few scattered herds of what are known as wild cattle. These are on large estates where they are preserved and allowed to reproduce in a state of nature. These wild cattle are assumed to be lineal descendants of the prehistoric ox. They are white in color, but with dark red or black hairs upon the ears and about the muzzle; have long, shaggy hair; heavy, upstanding horns, and are comparable in size with many of our domestic cattle. In a few instances wild females have been mated to domestic bulls, from which through several generations very excellent results have been obtained.

In a zoological way, cattle present certain features of special interest. They belong to the order of Ungulata or hoofed animals, which includes elephants, giraffes and camels. However, cattle belong to a sub-order of this group, having cloven feet, the horse belonging to another sub-order with a solid foot. The skeleton of the ox does not stand as high as that of the horse, and the bony processes of the spine form a line along most of the back that is nearly straight. The horns are essentially extensions of the corners of the skull, although there are breeds of cattle that normally have no horns. Cattle have no teeth at the end of the upper jaw; this part being covered with a tough membraneous pad, against which the incisor teeth at the point of the lower jaw press. In grazing the vegetation is caught between the teeth and pad, and is pulled rather than cut off. The ox has a compound stomach of four apartments, which occupies nearly three-fourths of the abdominal cavity, and in large animals has a capacity of as much as 60 gallons. When food is first swallowed, it goes into the large first stomach, the paunch, where it is softened and macerated, and overflows through a slit into the much smaller second stomach or honeycomb. From one or the other of these stomachs, by muscular contraction, the food is forced back to the mouth in small balls or "cuds," when rumination or "chewing the cud" takes place, which explains why cattle are generally known as ruminants. Rumination only takes place under conditions of quiet and rest, and not during grazing. After chewing the cud less than a minute, the food is swallowed, passing into the third stomach the manyplies, from which it moves on into the small abomasum or true stomach. In comparison with the stomach, the intestines in cattle are relatively small while with horses and swine the reverse is true.

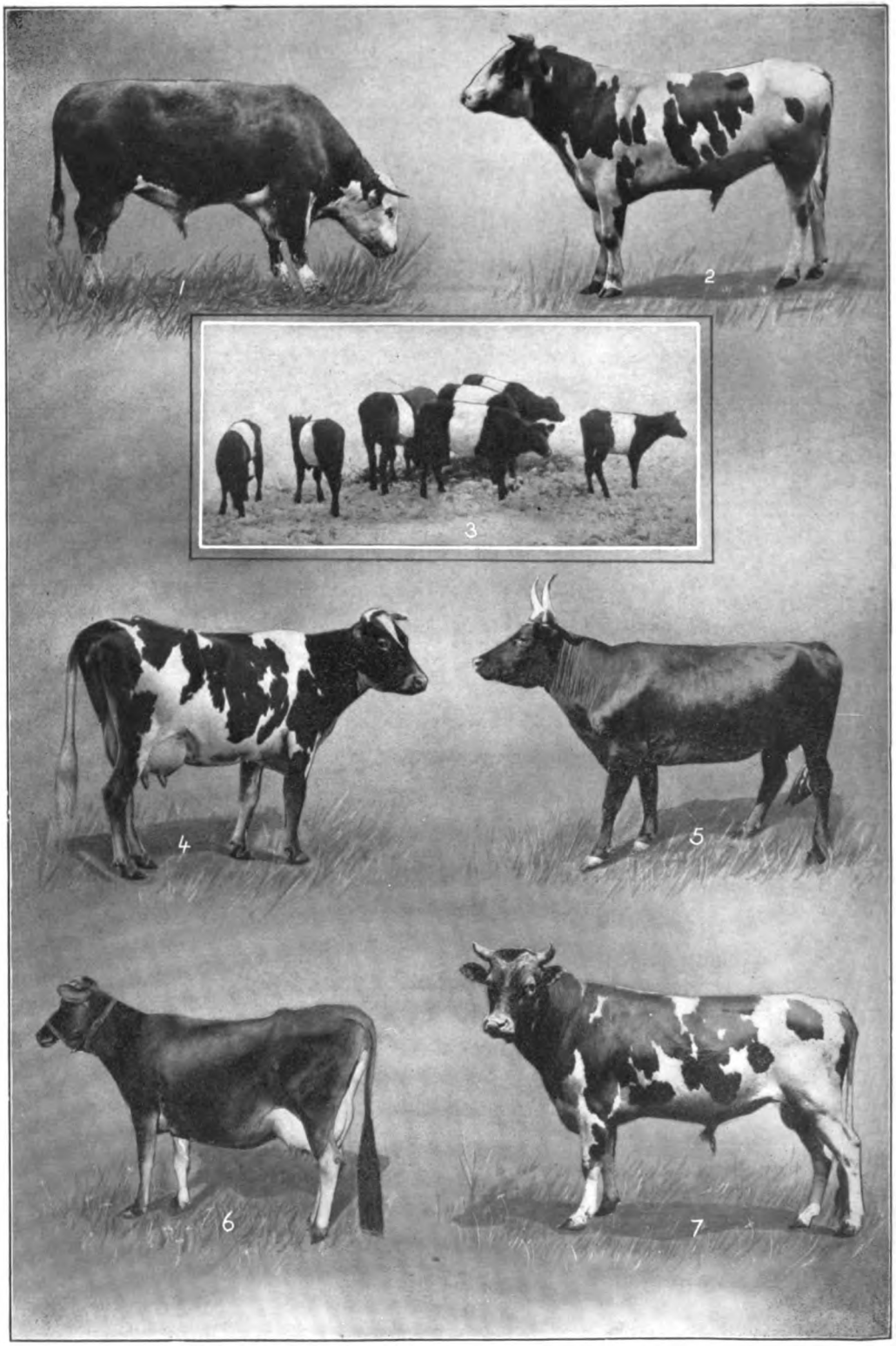
Cattle are world wide in their distribution, and either exist wild in a state of nature, or are of the domesticated, improved races or breeds. Among the wild cattle are the bison of America and Europe, the buffalo of Asia and Africa, the yak of highlands of central Asia, the gaur of India, the bantin of Java, Siam, Burma and adjacent countries, etc. There are various forms of buffaloes ranging from animals of small size to those of large proportions, and these are especially abundant on the continent of Asia and contiguous islands. South America and Australia possess no native wild cattle. Domesticated cattle are best represented in the various breeds used for food or labor that are found in large numbers in all countries where herbage is easily grown. In Asia and Africa is found a class of humped domesticated cattle, commonly known as the zebu, of which there are many breeds. These Indian or Brahman cattle, as they are often called, differ from our common domestic cattle in general bodily form, in possessing a more or less large hump over the shoulders, in shape of ears, depth of throat, curve and size of horns and form of skull, especially in its upper part. What are known as the common domesticated cattle of Europe and America differ in a marked degree in size, color and certain features of form. However, they are all essentially the same from an anatomical point of view, and belong to the same species. The variations referred to have been due to various factors, among which emphasis may be laid on environment, selection and the artificial breeding operations of man. In general our domestic cattle may now be divided into three classes or what are commonly known as types, viz., beef, dairy and dual purpose. Beef type cattle have short, thick necks; smooth shoulders; wide, prominent breasts; large heart girth; broad backs and loins; deep bodies; wide, level rumps; thick, meaty thighs and comparatively short legs. When in good condition, the body is smoothly covered with a thick layer of flesh indicative of great meat-producing capacity. Good examples of beef cattle have bodies resembling a parallelogram from side view, or square from the ends, having what is known as a "blocky form." Dairy type cattle are relatively thin of neck; somewhat prominent of shoulder; narrow of breast; deep yet lacking in thickness of chest; narrow at the withers and gradually widening along the back to the hips; long of rib and deep of middle; long and wide of rump; and comparatively narrow behind in the thighs. The females are notable for large udders capable of great milk production. This type is lean and muscular, and good examples show what is termed the "triple wedge" form. (1) As viewed from one side, the body gradually widens in depth from front to rear. (2) Viewed from above the body gradually widens back to the hips. (3) Seen from in front the body widens in wedge form from the withers (just over the shoulder) downward. The beef type is notably broad and flat, just above the shoulder tops, while the dairy type is narrow and sharp. Superior beef cattle as a rule are small milk producers, while to the contrary high class dairy cows are very inferior meat producers. Dual purpose, oftentimes termed general purpose, cattle, are fair producers of both meat and milk. They lack the thick,

CATTLE



1 Dexter Heifer
2 Ayrshire
3 Group of Guernsey Calves
4 Guernsey
5 Holstein
6 Shorthorn
7 Jersey Bull

CATTLE



1 Hereford
2 Holstein
3 Group of Dutch-belted Calves
4 Guernsey
5 Devon
6 Jersey
7 Guernsey

blocky form most desirable in the model beef animal, with less fullness over the shoulders and at the thighs. Dual purpose type cows should have good sized udders and show distinct evidence of milk-producing capacity. Our domestic cattle, are not only divided into types but into many breeds that have originated under widely different surroundings. The influences of climate and food, as well as the breeding operations of man, have resulted in many breeds within these types, each of which is quite distinctive in character and usefulness. The measure of merit in our herds of cattle is absolutely dependent upon the meritorious character in the breeds themselves. The common herds cannot be improved without the use of sires from pure bred herds.

The following breeds, grouped according to type, are the more important ones to be found in North America.

Beef Type.

Shorthorn cattle originated in northeastern England in the counties of York and Durham, where they first came into prominence during the last quarter of the 18th century. The color may be all red, red and white, pure white or roan, the latter being a commingling of red and white hairs without forming solid color. Mature males of this breed commonly weigh from 1,800 to 2,200 pounds, although some bulls much exceed this. Mature cows commonly weigh from 1,400 to 1,500 pounds, though the latter figure is often exceeded. This is a horned breed, very domestic in temperament, and is noted for the production of superior beef. It is the most universally distributed breed of cattle in the world, and is very popular in the United Kingdom, North and South America and Australia. Among the beef breeds the Shorthorn is noted for milk production and some families of the breed are especially famous in this regard.

Hereford cattle originated in Herefordshire, western England. It is a very old horned breed. The main body color is red, with white face; solid white markings usually occur on the legs about the ankles, the lower part of the belly, brisket and neck, top of neck, withers and brush of tail. Mature males often weigh 2,200 pounds, and females 1,500 pounds or more. Much heavier weights however are recorded. Hereford cattle are noted as grazers and rustlers, being unsurpassed for the range. They mature early and produce most excellent beef. The breed is largely restricted to Herefordshire in England, but is deservedly popular on the grazing lands of the United States, Argentina and Australia.

Aberdeen-Angus cattle, a black, hornless breed, originated in the counties of Aberdeen, Kincardine and Forfar in northeastern Scotland. Occasionally a red specimen occurs but these are not used for breeding purposes. Mature bulls of the breed weigh about 2,000 pounds, and females about 1,400 pounds. This is a famous beef breed, and in the British and American fat stock shows has long secured premier honors. The crossing of white Shorthorn bulls on Aberdeen-Angus cows has long been a custom in the English-Scotch border country, their union producing the famous blue-gray steers which yield the best of beef. Aberdeen-Angus cattle are popular in Scotland, have a strong clientage in the United States west of the Mississippi and are regarded with favor in Australia.

Galloway cattle are black and hornless, and originated in Galloway district, southwest Scotland. It is a beef breed of medium size, mature bulls weighing about 1,900 pounds and cows 1,200 pounds to 1,400 pounds. This breed is especially adapted to grazing, and does not do its best under conditions of small farming and confinement. It cannot be regarded as a popular breed, and has a comparatively limited clientage. This is largely due to a nervous disposition and a tendency to fatten slowly, although Galloways make very superior beef. The four beef breeds referred to are the only ones of importance in America.

Dairy Breeds.

Jersey cattle originated on the Island of Jersey, one of the group of Channel Islands near the coast of France. There they have been bred pure for more than a century. The law of the island prohibits the introduction of any other breed. Jerseys are fawn in color of various shades, such as yellow, red, brown, mulberry, silver, etc. White markings are not rare, though not popular. Bulls at maturity commonly weigh 1,250 to 1,400 pounds, and cows from 850 to 900 pounds, many animals, however, exceeding these weights. The most striking features in the Jersey are the color, the wedge form, the short, dished face, the prominent, beautiful eye, the fine bone, and deer-like character of the young calves. This is distinctly a dairy breed. The average yield for the better cows is about 7,500 pounds of milk a year, although the cow Passport 219742 has an official record of 19,695 pounds for a year. Jersey milk usually tests 4½ to 5 per cent fat, and is of very superior quality. Many Jerseys have produced 400 pounds of butterfat in a year, Sophie 19th of Hood Farm 189748 having to her credit the great yield of 999.14 pounds. Jersey cattle are very popular in England, the United States and Canada.

Guernsey cattle are native to the island of Guernsey, also one of the Channel Islands. Guernsey, like Jersey, prohibits the introduction of any other cattle, excepting for slaughter, and the cattle on Guernsey have been bred pure for many years. Guernseys are fawn of color, usually of a reddish shade, and frequently have white markings. The standard size for mature bulls is about 1,500 pounds and 1,050 pounds for the cows. In recent years these cattle have made remarkable improvements and many large records of milk and butter-fat are credited to the breed. The better class of cows will average about 8,500 pounds per year of milk that is about 5 per cent fat. Nearly 5,000 cows have averaged 437 pounds of fat in a year, the largest record being 1,098 pounds produced by Murne Cowan 19597. Guernsey butter is noted for its yellow color. This breed is more especially known in England and the United States east of the Mississippi.

Ayrshire cattle originated in southwestern Scotland, with the county of Ayr as a centre. These cattle frequently have rather long, large, erect horns. The color of the hair is a com-

bination of red, brown and white markings, with white in most favor at the present time. Ayrshires while a dairy breed tend to be somewhat smooth bodied, and may be fattened to make very fair beef. At maturity standard weights will approximate 1,500 pounds or more for the bull and 1,100 pounds for the cow. Ayrshire cows of the better class, when mature, will average about 9,500 pounds of milk, testing 3½ to 3¾ per cent fat. Lily of Willowmoor 22269, a famous cow of the breed, produced 955.56 pounds of fat in a year. In their native land, the milk of these cattle is in much favor for making cheddar cheese. Ayrshires are little known outside of Scotland, the Scandinavian countries, the eastern United States and Canada.

Holstein-Friesian cattle originated in Holland, where they have been bred for centuries. This is a horned breed, and is black-and-white in color, in large markings. Present day popularity favors a preponderance of white. This is a large breed, and mature bulls weigh usually 1,800 to 2,000 pounds, and cows 1,250 to 1,400 pounds. There is considerable variation in type within this breed, with good examples of both dairy, beef and dual purpose type. However, the most popular style is the dairy type, with some thickness of thighs and smoothness of fleshing. Holstein-Friesian cows surpass all others in milk production. They have large udders, but produce milk of quite ordinary quality, testing 3 to 3½ per cent fat, under average conditions. The better cows of the breed will average about 15,000 pounds of milk in a year and 500 pounds of butter-fat. The cow Lutscke Vale Cornucopia 110505 produced 31,247 pounds of milk, while Duchess Skylark Ormsby produced 1,205 pounds of fat each within a year. Holstein-Friesian cattle, or closely related Dutch breeds, are popular in Holland and much of northern Europe and are looked upon with much favor in the United States.

Dutch Belted cattle originated in Holland, where they have long been bred in a very small way. They are of a dairy type, and are black in color excepting for a white stripe which encircles the body between hips and shoulders. These cattle have thus far made few records of interest, and they are little bred excepting as a fad for their peculiar markings.

Kerry cattle are of Irish origin. They are black in color and comparable with a small Jersey as to size. The Kerry is distinctly a dairy breed, that has been comparatively little improved, but the better cows produce 5,000 to 6,000 pounds of milk a year. This is a very hardy breed, and is but little known outside of Ireland, there being hardly a dozen herds in America.

Dexter cattle are also of Irish origin, and are perhaps an offshoot from the Kerry. This is the smallest breed of British origin, bulls at maturity often weighing 600 to 700 pounds and the cows about 500 pounds. These cattle may be all black or all red. They not only produce choice small carcasses of beef, but some of the cows give comparatively large yields of milk, one English Dexter being credited with 12,000 pounds in a year. These cattle are little known outside of Ireland and England. In the United States there were not over 10 herds in 1917.

French Canadian cattle originated in the province of Quebec, Canada, perhaps 200 years ago. It is a black or black-fawn breed, small of size, comparable with a small type Jersey. But little has been done in improving this breed. French Canadian cows produce a fair amount of milk testing slightly above 4 per cent fat. These cattle are almost unknown outside of Canada.

Dual Purpose Cattle.

Red Polled cattle are native to the counties of Norfolk and Suffolk in England. As indicated by the name, these are hornless, red cattle. Mature males ordinarily weigh 1,800 to 2,000 pounds, and cows from 1,250 to 1,300 pounds. This is a distinctly dual purpose breed, and is so advocated in America and England. A milk record of 5,000 to 6,000 pounds a year is quite common, though Jean DuLuth Beauty 31725 produced 20,281 pounds in a year. The milk is a good standard, testing about 3.75 per cent fat. Cattle of this breed incline to be somwhat nervous of temperament, in comparison with Shorthorns. Red Polled cattle are mostly found in eastern England and in the central United States.

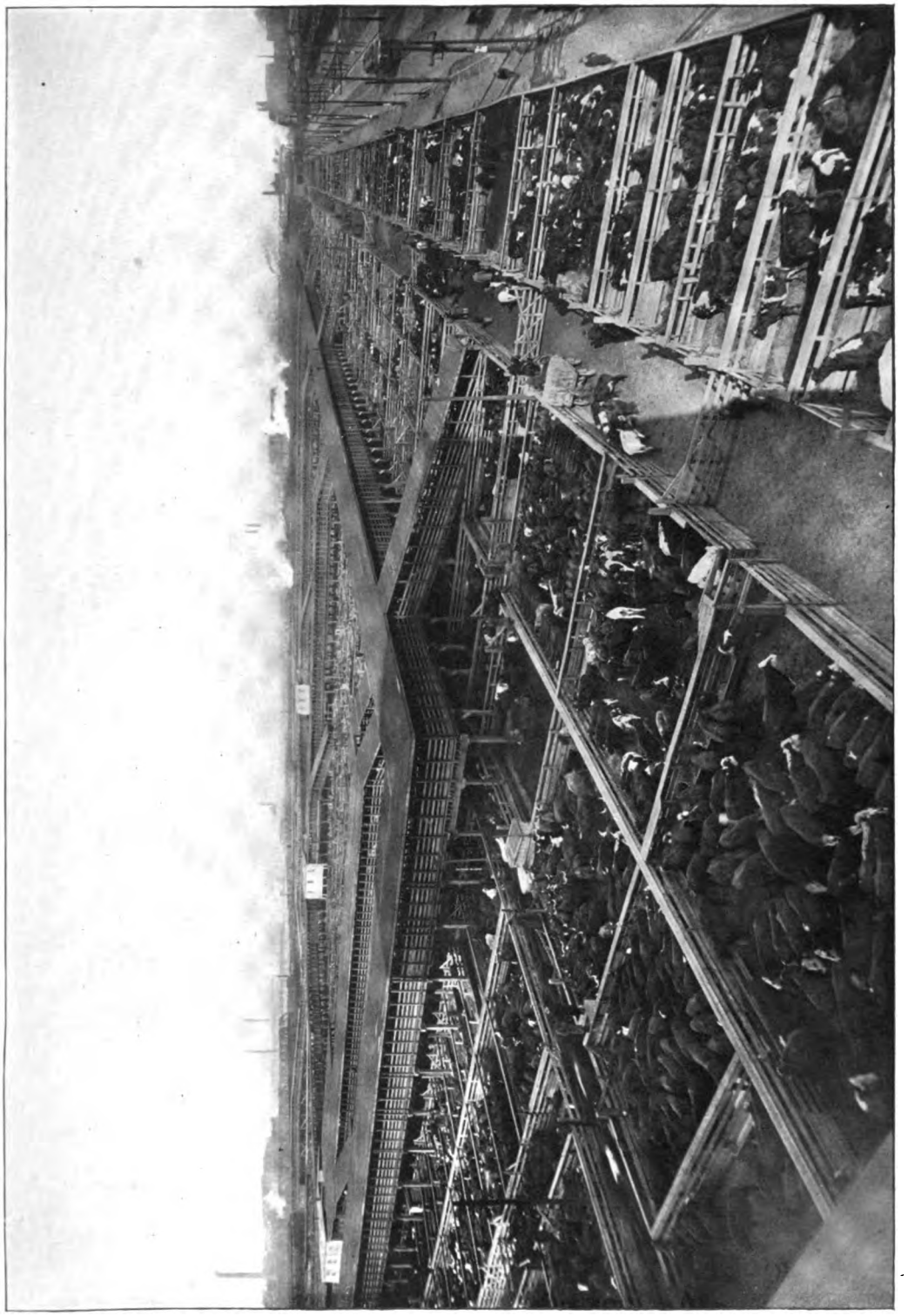
Devon cattle originated in Devonshire, southwest England, being a very ancient breed. This is a horned, red breed. There are wide extremes in type with the Devon, but most breeders in the United States, located in the East, regard it as of a dual purpose type. At one time this was a very popular breed in America, but is now rarely seen. There are no official milk records for this breed in America. The better cows produce a fair yield of excellent milk.

Brown Swiss cattle are native to Switzerland, in the eastern section. This is classed as a dairy breed by the American Brown Swiss Cattle Association, but is really a dual purpose breed, and is so regarded in Switzerland. The color is usually dark brown, with mealy or creamy marking about the muzzle, the udder, inside the legs, and sometimes along over the back bone. This is a large, horned breed, with rather coarse heavy bones; mature bulls weighing 1,800 to 2,000 pounds, and cows 1,300 to 1,400 pounds, with many exceeding these weights. Brown Swiss cows yield under fair conditions 5,000 to 6,000 pounds of milk a year, testing 3½ per cent fat. The cow College Bravura 2d has a record of 19,461 pounds of milk. These cattle are comparatively little known in the United States.

Statistics of the Number and Distribution of Cattle.

Statistics relative to the number and distribution of cattle in the world are of interest. According to the most recent census figures available, the following are the 10 leading cattle producing countries of the world:

Rank	Year of census	Country	Number cattle
1	1910	United States	64,149,000
2	1910	Russia in Europe	37,369,000
3	1912–13	Brazil	30,705,000
4	1908	Argentina	29,124,000
5	1914	Germany	21,817,000
6	1910	France	14,533,000
7	1914	United Kingdom	12,185,000
8	1910	Australia	11,745,000
9	1910	Austria	9,160,000
10	1908	Uruguay	8,193,000



Cattle Pens, Kansas City Stock Yards

The 10 leading States of the United States in cattle interests are the following, based on statistics of the United States census for 1910:

Rank	State	Number of cattle	Value
1	Texas	6,935,000	$132,986,000
2	Iowa	4,448,000	118,864,000
3	Kansas	3,079,000	80,557,000
4	Nebraska	2,932,000	73,074,000
5	Wisconsin	2,680,000	67,475,000
6	Missouri	2,561,000	72,884,000
7	Illinois	2,441,000	73,454,000
8	New York	2,423,000	83,062,000
9	Minnesota	2,347,000	50,306,000
10	California	2,077,000	52,785,000

The total value of the cattle of the United States as a whole is given at $1,499,524,000. In 1910, Wisconsin, New York, Iowa, Illinois and Minnesota each had over 1,000,000 dairy cows, New York leading with 1,500,000. At the present date, 1 Jan. 1917, Wisconsin leads in numbers of dairy cattle. The average value of milch cows in the United States on 1 Jan. 1916, according to United States Department of Agriculture statistics, was $53.90, and of other cattle, $33.49. Chicago is the great cattle market of America. In 1917 there were received at the Union Stock Yards, Chicago, 3,209,427 head of cattle having a valuation of $322,256,581. During the past 50 years there has been a grand total of 106,423,963 head of cattle shipped into the Chicago yards, the largest receipts for one year being 3,571,796 head in 1892. The general tendency in the United States is to an increase in the number of dairy cattle, and a decrease in beef cattle. With increase in population and the development of large urban communities is associated increased demand for milk. The census shows that from 1900 to 1910 there was an increase of about 20 per cent in dairy cattle in the United States. The beef supply, however, has fallen off to a notable degree, in comparison with growth in population, so that we are now hardly producing enough beef for domestic use. For the 10 years up to 1915 inclusive we have the following interesting records of export and import trade on live cattle:

	EXPORTS		IMPORTS	
Year	Number of cattle	Value	Number of cattle	Value
1906	584,239	$42,081,170	20,119	$548,430
1907	423,051	34,577,392	32,402	565,122
1908	349,210	29,339,134	92,356	1,507,310
1909	207,542	18,046,976	139,184	1,999,422
1910	139,430	12,200,154	195,938	2,999,824
1911	150,100	13,163,920	182,923	2,953,077
1912	105,506	8,870,075	318,372	4,805,574
1913	24,714	1,177,199	421,649	6,640,668
1914	18,376	647,288	868,368	18,696,718
1915	5,484	702,847	538,167	17,513,175

Economic Factors.

There are various factors explanatory of the decrease in beef production and our export trade. The area of free grazing lands west of the Missouri has largely diminished, many of the large private ranges have been divided and it has not been possible to produce cattle thereon as cheaply as in the past. In the central-west, in the heart of the corn belt, where beef cattle have been fed in great numbers, land values have increased to such an extent that, considering the cost of corn, many have discontinued feeding beef cattle, because of the loss involved, or small margin of profit. On the other hand, in the more thickly settled States, many farmers have changed from beef to dairy cattle, owing to the large demand for milk and the greater profit in its production in comparison with beef production. Experimental research in Europe and America, notably by Lawes and Gilbert of England and Trowbridge and Eckles of Missouri, show the dairy cow to be a much more economical converter of products of the field into human food, than is the beef-producing animal. From 100 pounds of digestible matter in the food eaten, according to Jordan, the cow producing 139 pounds of milk yields 18 pounds of edible solids, while the dressed carcass of the steer yields but 8.3 pounds marketable products, of which but 2.8 pounds are edible solids. These figures show about six times as much edible solids in the milk of the cow as in the carcass of the steer, the result in each case from equal amounts of digestible food. The feeding of cattle involves a wide range of ages, condition and purpose of the animals fed, availability of feeding stuffs and relationship to markets. Extensive experiments, especially in Germany and America, have resulted in establishing feeding standards for cattle and other animals under certain conditions of weight and production. The evidence demonstrates that for 1,000 pounds live weight, or fraction thereof, there is required within limitations a specific amount of dry matter, digestible crude protein and total digestible nutrients, showing a certain nutritive ratio. Modern science has provided the stockman with standards of the composition of feeding stuffs, as well as feeding standards, whereby he may without difficulty feed his animals rations supplying the correct amounts of digestible food for their several needs. At the present day many stockmen make use of feeding standards as necessary guides to intelligent practice. Quoting the Wolff-Lehman standard, as given by Henry and Morrison in 'Feeds and Feeding,' we have the following illustrative standards for fattening cattle:

PER DAY PER 1,000 POUNDS LIVE WEIGHT

Animal	Dry matter. lbs.	Digestible crude protein. lbs.	Total digestible nutrients. lbs.	Nutritive ratio
Steer, fattening 2 yr. old on full feed				
First 50–60 days	22–25	2.0–2.3	18.0–20.0	7.0– 7.8
Second 50–60 days	21–24	1.9–2.3	17.0–19.5	7.0– 7.8
Third 50–60 days	18–22	1.8–2.1	16.0–18.5	7.0– 7.8
Ox at rest in stall	13–21	0.6–0.8	8.4–10.4	10.0–16.0

Special tables are prepared for dairy cows, in which certain amounts of nutrients are allowed for maintenance of the body functions, to which is added required crude protein and total digestible nutrients for each pound of milk based on its percentage of fat.

A large variety of succulent feeds, hay or dry roughage, grain and milling by-products are suited to the needs of cattle. Beef calves as a rule nurse their dams six months or more, while calves from dairy cows are taken from their dams in two or three days, and are gradually changed from whole to skim milk, being fed the latter from three to four weeks of age up to eight months or so. Among the standard foods much in use for cattle in the United States besides pasturage are the following dry roughages: timothy, blue grass, red top, alfalfa,

red clover, corn fodder and stover. Of grains we have Indian corn and oats, with a wide variety of by-products from mills handling wheat, corn, barley, cotton and flax seeds. Silage, mainly from corn, is extensively used as a cattle feed, both in milk and beef production. In making up standard rations, dairy cows are fed approximately two pounds of dry roughage or one pound of this and three pounds of silage daily, for each 100 pounds of live weight, with enough concentrates (grain or by-products) to adjust the entire ration to the feeding standard. Experimental results have shown that it is good practice to feed dairy cows daily about one pound of grain for each three to four pounds of milk produced, cows producing rich milk, as Jerseys or Guernseys, requiring the lesser amount. Fattening steers may be given daily about two and one-half pounds of dry roughage (or the equivalent in silage) and concentrates for each 100 pounds of live weight, the amount of concentrate ranging from one to one and three-fourths pounds for each 100 pounds live weight, based on the degree of fattening.

Extensive losses occur from disease among cattle, of which the more common are tuberculosis, contagious abortion, black leg and Texas fever. Based on figures reported, we have an annual loss in this country from disease, exposure, accident, etc., estimated at $177,750,000. The seven most important losses are as follows:

Miscellaneous live stock diseases	$41,416,000
Black leg	27,551,000
Insufficient or irregular feeding	27,196,000
Exposure	21,686,000
Tuberculosis	19,197,000
Contagious abortion	16,353,000
Texas fever and cattle tick	10,487,000

Inquiry was addressed to numerous agents of the United States Department of Agriculture as follows: "For every $100 worth of cattle in the county what would you consider the extent of yearly loss from all causes indicated above?" replies to which gave an average of $7.11 for the entire United States. See ANIMALS, DOMESTICATED; DAIRY INDUSTRY; CATTLE, DISEASES OF; LIVE STOCK, FEEDING OF; STOCK BREEDING.

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CHARLES S. PLUMB,
Professor of Animal Husbandry, The Ohio State University.

CATTLE, Diseases of. Contagious Diseases.— All such diseases are communicable to other susceptible bovines by a microbe of some kind, which may be large enough to be demonstrated by a good microscope, or so infinitesimal as to remain invisible under the strongest magnifying powers (ultravisible). But all alike show their generative power by causing the disease in any susceptible animal inoculated, and this continuously so long as new susceptible subjects are presented — causing a plague or epizootic. Plagues of cattle present a different problem from plagues of man, in the entire absence of any moral restriction on the available modes of restricting them or stamping them out. Among the early cattle plagues in the Old World, Rinderpest stood out as the most contagious and deadly, practically all bovine animals exposed contracting the disease, and nearly all dying. Since the beginning of the Christian era this plague has prevailed in China, Mongolia, Siberia, etc., and extended west into Europe whenever a great ruler was seized with an extension of territory mania, and involving central Europe in war, created a great demand for large army supplies and the movement of great bodies of cattle from the East. Protected by her enclosing seas Great Britain largely escaped. In the war-ravaged 18th century the resulting losses in Europe were estimated at 200,000,000 head. In the 19th century active commercial intercourse largely displaced war as a cause, unduly temptting corrupt and corruptible dealers. In the 18th century Great Britain, writhing under her unwonted losses, fell back on the rational device of quarantine of infected districts and slaughter of the herds, with indemnity to the owners, and, though the effect was slow under the varying earnestness or intelligence of local authorities, the plague was eradicated. Britain's next invasion (1865) was through a cargo of cattle from Reval, Russia, and spread rapidly through the island, causing ruinous losses, until stockmen could be educated anew to the conditions, after which it was easily stamped out, as it had been a century before. Again and again (1872 and 1878) it invaded Britain through her active commerce, from Russia and Germany, but the country already instructed and prepared made short work of it.

Another pest, lung plague of cattle, invaded the British Isles through the Dutch trade (1839) and prevailed until 1898. Being 26 years before the 19th century experience with Rinderpest, and of slower progress and less fatal, stockmen remained long obtuse to the danger and temporized with the plague, trusting largely to inoculation from the diseased lung into the tip of the tail, where, in the absence of abundant connective tissue to accommodate the phenomenally large liquid exudate thrown out into the inflamed structures, the lesion remained circumscribed and the system at large had become

immunized before the ultravisible germ reached the lung, its natural habitat. Though successful in immunizing and saving the inoculated herd this virtually spread the disease-germ — in the buildings, yards, pastures, manure, fodder, etc., of the animals operated on and the pest was kept alive for 59 years, until more thorough and radical measures were adopted.

Lung plague was imported from England into Brooklyn, N. Y. (1843), into New Jersey (1847) and into Boston, Mass., from Holland (1859). The New Jersey importer stamped it out by promptly killing the whole herd; the Massachusetts authorities cleared that State by killing all infected herds at a cost of $77,511.07 for indemnities. The Brooklyn outbreak persisted for 49 years, extending into New England, New York, New Jersey, Pennsylvania, Maryland, Delaware, District of Columbia, Indiana, Illinois and Wisconsin. In 1887, when the National Stock Yards, Chicago, became involved, and the whole continent was imminently threatened, a campaign for extinction was started. In three months the plague-stricken Chicago and Cook County were cleared, and by 1892 the United States was once more free, though at a heavy cost in cattle. For long this outbreak failed to spread widely because the cattle traffic was practically all *eastward* to the large cities on the Atlantic seaboard, and this plague was finally carried West by a comparatively new but considerable traffic in thoroughbreds, and in calves sent to replace losses in the Western herds. This but repeated the Old World experience that in countries breeding their native stock, as in Spain and Portugal, Norway, Scottish and Welsh Highlands, cattle remained long free from this and other plagues. The same is true of the Channel Islands. It strongly emphasizes the necessity of stopping the movement of all stock, and even men, in districts where a deadly pestilence prevails, of killing all infected herds (sick and well) and of thorough disinfection of the carcasses, manure, litter, fodder and articles of all kinds that can by any possibility carry infection. The writer found that sterilized exudate from the diseased lung, when injected under the skin, immunizes such animals against attack on exposure. If prepared without possibility of survival of the living germ this is entirely safe and harmless, but the probable escape of the live germ, excepting in the most careful preparation, forbids its general use. In case of high class cattle and under skilful supervision it may be profitably used on an already infected herd, kept absolutely separate from others.

Foot and Mouth Disease.— This has been repeatedly introduced into the United States in cattle, sheep and swine, and by cowpox virus, and has secured a wide and threatening prevalence on different occasions. It is perhaps the most contagious of cattle diseases, and since other cloven-footed animals (sheep, goats and swine) are about equally susceptible with cattle, and other warm-blooded races and man are only slightly less so, it has at times caused much apprehension and dread; veterinarians have pronounced it dangerous and fatal, and government authorities have enjoined that all infected animals, herds and flocks be promptly slaughtered and the places disinfected. It is, however, one of the mildest and least fatal of cattle diseases, proving lethal only when the infection has been swallowed in the food (milk, water, soiled fodder, etc.) and has set up the diseased process on the alimentary canal (stomach, bowels). As usually occurring it shows itself in isolated blisters one-third to one inch in diameter on the mucous membrane of the muzzle, lips, cheek, tongue and throat, on the teats and between the hoofs (extending up in front and behind). Each blister shows but one undivided sac filled with a clear serum (a cowpock of about the same size is separated by internal partitions into a number of separate sacs and must be pricked again and again to empty it). The disease has a period of incubation of from two to eight days in cold weather, followed by some dullness in appearance and rise of body heat, a pink color of the membrane of the mouth, heat and some tenderness of the teats and between the hoofs, and soon movements of the jaws, accumulations of white froth in masses around the lips and a driveling of liquid saliva. A loud smacking usually follows caused by gaping, parting of the lips and separation of the tongue from the roof of the mouth. The simultaneous attack of the whole herd and the concentration of the lesions on the three points named make a characteristic picture. The implication of sheep, goats or swine in the same building, yard or road is equally striking. The rule is that when kept clean, fed soft, sloppy food and treated with mild antiseptics, the patients improve rapidly and are well in 14 days, and after an attack they can be considered immune for a length of time. They may have a second attack a year later. As reassuring data it may be stated that in the United States, and in Great Britain it was the rarest thing to have a death occur. McMinn's cattle insurance statistics, covering long periods of prevalence of the plague, give not a single reference to a death. The writer's experience, having lived on a Scottish farm in his youth, was that feeding cattle, bought in the fall market, usually brought the infection with them, passed through the attack in the first fortnight and recovered without exception; and that the next spring crop of calves lived and throve without any sign of the malady, even in cases of neglect of disinfection. The infection became inert when dried for 24 hours at 88° F., but remained virulent for nine months when kept at 32° F. (Loffler). It infected men who consumed butter and cheese from infected herds; others have eaten this without harm, but these were in infected districts and the experimenters were veterinarians with ample previous opportunity for exposure to the disease and consequent immunization. It should be added that the outbreak of 1870, imported in English cattle landed at Levis (Quebec), which spread through Quebec, Ontario, New York and New England, showing its virulence by sparing no bovine in any herd it entered, and extending to swine, sheep and human beings as well on the farm, ran its usual Old World course of two weeks, then subsided for lack of susceptible subjects, and, on the coming of spring and the fresh crop of calves, it failed to attack any one of these. There had been no killing, not even an official quarantine; only the owners secluded the stock as usual in winter quarters, and this allowed time for the spontaneous death of the germ. Again, the New England outbreak of 1902 from

contaminated cowpox virus occurred, like the Quebec one, in the fall, and should have had an equal chance of dying out quickly but for the fact that it involved a number of large dairies supplying milk to Boston and other big cities and that it was officially subjected to compulsory slaughter, so that dairymen attempted to hide the existence of the malady as far as possible to prevent the ruin of their milk business, their chief or only source of livelihood. The animals were huddled in close, unsanitary quarters, too often along with concealed manure, and thus contracted secondary diseases from septic infection of the sores, which rendered the affection much more complex and injurious. The outbreak and these results lasted until May 1903, seven months after the Federal government took the matter in charge (or a year after the first circumstantial report of the existence of the pestilence in the State). This outbreak is in most marked and unhappy contrast with the experience of the simple disease in Scotland, Canada, New York and New England in 1870; also with a number of more restricted outbreaks in which newly imported cattle were kept until they had passed through the disease and recovered.

Prevention, Exclusion.— For any disease like this, exclusively microbian, always requiring importation to start the first case in any outbreak, non-fatal, lasting but two weeks, with microbe easily sterilized, the cheapest and most efficient resort is still to exclude it absolutely from the country by preventing importation. All warm-blooded animals must be shut out because these can contract the disease under favorable circumstances and can harbor the microbe causing the affection and convey it to other susceptible animals. This would of necessity shut out not only warm-blooded animals, but also their products: hides, horns, hoofs, hair, wool, bristles, feathers, down, bones, meats, dried muscles, tendons, sausage cases, extracts of all kinds made from such animals, wet or dry, blood, manure, virus, bacterins, miscalled vaccines, real vaccine (cowpox variola) and all other products that could convey foot and mouth disease. It would also exclude immigrants, and especially stock men, and those with soiled clothes until these were sterilized by heat. This is confessedly a large order, but we have already suffered through these channels and are liable to suffer again and again while present methods continue. Which then is better: to make our own products at home, or to stamp out every few years a pestilence threatening all of our 90,000,000 head of cattle that it can reach, and their yearly offspring, until the pest is thoroughly extirpated? An alternative would be to detain all such imported animals and animal products at the port of arrival, quarantining the former under the most rigid and inflexible rules for one month, or more if needed, under constant professional supervision; and sterilizing the latter by heat or by thorough disinfection before they were released. The mere exclusion of live imported cattle or their safe seclusion after arrival would be open to continual accidents and loophole escapes. Birds, insects and even vermin would open the way for escape of infection. The efficacy of a perfect quarantine and disinfection was evidently recognized by the Federal officials, who, under the urgent protest of the owners of thoroughbreds then on exhibition in the Chicago International Cattle Show, retained the whole exhibit for a length of time and after disinfection finally released them. But inconsistently enough a highly valued thoroughbred herd outside the city was ruthlessly slaughtered; and again, when the Chicago Stock Yards were closed, several days' grace were allowed so that stock unexpectedly caught there could be disposed of. As might be expected the disease made its way in several new directions in the interval.

A costly and irremediable result of the slaughter of some of the best stock in the country lay in the sudden removal of priceless cattle that it had cost lifetimes to secure and the rendering impossible of the birth of their equally priceless prospective issue. It was a deed that could in no way be claimed as wise foresight, loyal patriotism nor devotion to the interests of live stock improvement or national prosperity. Official reports of cattle killed and paid for (1902–03) in the New England invasion were $179,572.37. For that of 1908 referred to above the charges for cattle killed were $376,785.39, but these do not take into account the other losses to the stock owners, the interruptions, often permanent, of business connections and enterprises, the outlays made imperative to establish new lines of trade, the losses incident to restocking (when the old stock could have been profitably retained) and the certain loss of all prospective issue of the stock needlessly killed. The officials have sought to excuse their actions by quotations of heavy losses in dairy cows kept day and night in close, offensive city stables, the empty stalls being promptly filled from city markets charged with infection, and again of others from Germany, where, in addition, every city maintained its *Freibank* for the sale of defective meat at a cheap rate, and through which there was inevitably a continuous distribution of infection.

Treatment consists in scrupulous cleanliness and dryness, with the use of healing lotions weak enough to be non-irritating — alum, borax, copperas, blue stone, aniline blue, formalin, hypochlorite of lime (bleaching powder), or, better still and cheaper, the Carell-Dakin's combination of lime hypochlorite (30 per cent chlorine), 4½ ounces put in a bottle with 5 quarts water and shaken often for 6 hours; 2 ounces dried soda carbonate and 1½ ounces bicarbonate of soda in 5 quarts water put in a separate bottle, well shaken and set aside for 6 hours; add the two liquids together, shake well for some minutes; set aside for one-half hour; siphon off the surface water without disturbing the precipitate; filter through paper and use.

Immunity.— Viewed broadly, this consists in invulnerability of a living body to the attack of a microbe. Such resistance may apply to a particular microbe or many. Every race of animals shows a susceptibility to its own microbian enemies and insusceptibility to others, and where the latter is very pronounced the blood or other serums may often be used on other susceptible races to confer a measure of immunity. But this is not an invariable result; one animal, with a strong vulnerability to a given microbian affection, when it has once passed through that disease and recovered, shows an equally potent acquired immunity

when again exposed to it. Another animal which naturally shows a strong tendency to suffer from a microbian or other protein poison when once it succumbs to it will show a far greater and more dangerous proclivity when exposed to it again (anaphylactic). This is the exact opposite of immunization. Observation and experience must guide as to the result to be expected from the use of any microbian or protein poison on an animal of a given race and in given conditions. The tolerance or intolerance of a given race, or animal, to a microbian poison cannot be asserted until one knows the action of that poison on that race and the history of that particular animal as regards previous infection, immunization and exposure. Vulnerability is also liable to be affected by age, by food and by other proteins generated in the body or outside of it. Rats confined to an exclusively animal diet become highly resistant to anthrax. Algerian sheep bred for long ages in a highly anthrax district now retain a surviving race immune from this disease, whereas elsewhere flocks are quickly cut off in an anthrax environment. Pigs, dogs and fowls (meat eaters) are highly resistant to anthrax, but subjected to a low temperature they succumb readily. The animal food of sucklings largely protects them from diseases to which they are obnoxious when put on a weaned diet. Some proteins which are highly injurious to man and animals when injected directly into the veins are habitually eaten by the same and prove harmless, once they have been digested by the stomach secretions and absorbed through the gastric mucous membrane. As examples of other poisons which greatly increase susceptibility to disease we have the effect of lactic acid, of the sarco-lactic acid developed in the muscles of an animal subjected to hard work and of phloridzin, which greatly increase the virulence and mortality of anthrax. These must serve to illustrate the many loopholes (known and still unknown) which interfere with disease-products in dealing with contagion and in immunization. And yet, where applicable, such agents act with a success that may be considered almost magical. No known resort is more reliable in appropriate cases, and with care many of the pitfalls can be avoided, while if the protective or curative agent can be taken from the already infected herd and from no other, we safely escape any blunder in diagnosis and the far greater risk constantly present in using commercial products made in laboratories, where they may come from a far different disease, with an utterly different microbe, products, therefore, which are useless for the disease in hand and even likely to introduce and disseminate the germs of a second malady to complicate the problem we have to meet and add perhaps materially to the mortality. Our repeated unhappy experiences in the importation in cowpox germs of an admixture of those of foot and mouth disease should settle for all time the safety of autotherapy from the herd itself and make it first choice over the uncertain and dangerous commercial laboratory products. If taken from the infected herd itself and applied to it, it cannot introduce any new and redoubtable infection, and if the existing infection is that of a contagious and self-limiting disease there is every reason to expect that the attack will be shortened and quickly ended. In the case of foot and mouth disease, or any other mild, non-fatal and short-lived affection, every animal would be at once put under the sway of the poison, all would recover simultaneously, the herd would be released at an earlier date and any danger to other herds would be at an end.

The process of immunization is confessedly a complex one. If effected through the agency of the antibodies (defensive agents) found in the healthy blood and tissue cells of the sound animal body charged with the duty of protecting the body when assaulted by the poisons (toxins) produced by the invading microbe (of which a large number have been identified and named), also by bodies that tend to devitalize and destroy the invading microbe, the case is simplified somewhat. These defensive products, in small amount at first, go on increasing in quantity and potency as the disease progresses, and, in favorable cases, the patient recovers. The body and tissue cells having passed through this extraordinary stimulus to produce these defensive products in excess, continue the same work indefinitely (sometimes for life) and protect the system from any new attack. If on the contrary the invading organism is too potent, or the system is too feeble to react sufficiently, the victim is doomed and perishes.

We see the working of this defensive reaction in all the lesser physical ailments and injuries which have not been habitually classified as contagious. This protective power implanted at birth is really the great healer, and the surgeon is condemned to stand by as an assistant, soothing by quiet rest, a suitable position or support and checking infections that fall on the wound, while the body itself performs the cure through granulating tissue and perhaps with earthy salts (as in broken bones) drawing together the gash in the skin, firmly knitting the broken bone, etc. It was in such surgical cases that the auto-cure by the defensive powers of the body for long maintained its highest reputation, largely because the seat of the trouble could be so thoroughly reached by non-irritating antiseptics, but in too many cases it is prudent to see that the potent powers of the defensive cells against microbian invasions should be no less availed of. Before the days of self-immunization as a medical weapon it was familiar to see poll evils and fistulas of the shoulder, withers and elsewhere persisting for many months, often fed by continuous additions of infection from local sources, which to-day would recognize the potency of nature's healer and of the pus discharge from the open sore (sterilized). So, too, when pus infection from an unseen source keeps up a constant succession of pustules, boils and other surface suppurations, the auto-cure will often restore the balance and strongly contribute to a recovery. In foot and mouth disease, cowpox and vesicular sore mouth, of approximately the same period of incubation and duration, and equally mild and non-fatal, the auto-cure is plainly invited. No high mortality demands slaughter. There are always a few days' delay before such cases are reported; with a large herd a few days are needed to prepare for burial; the disease has meanwhile reached its height, and, left to itself, recovery would soon have been far advanced. Nothing is to be gained by killing — not even time; the

heating of the saliva for half an hour to 212° F. in a suitable apparatus will insure sterilization so that, in the absence of all living germs, it can be used with full confidence of safety, and even in other diseases (spore-forming), and therefore liable to infect premises and soil, it is only necessary that the virus shall be subjected to repeated heatings with intervals of 12 to 24 hours to allow for the sprouting of the spores to form microbes, and a sterilized product is obtained.

A list of the more common contagious diseases is here given, indicating their adaptability or otherwise to the employment of autotherapy: (1) *Cattle pests too contagious and fatal to admit safe autotherapy:* Rinderpest, canine madness, chronic bovine dysentery (Johne's disease). For these the cheapest, safest and most effective resort is to stop any movement whatever of animals of any kind within a very large area around the herds known to be infected, to kill the infected herds, to burn or bury the carcasses and products and to thoroughly disinfect the premises, pastures, etc. (2) *Cattle pests in which the germs are preserved in dead tissues of the living body, caseated or pus products,* etc., to spread the malady after recovery: Lung plague, calf diphtheria, tuberculosis, gangrenous coryza (cold in the head), catarrh of the nasal sinuses, caseated lymph glands, anthrax, foot rot. In these autotherapy should be used only under careful restriction and good judgment. (3) *Cattle pests in which the germs survive indefinitely in air, earth or water, to spread the affection later:* Anthrax, black leg, tetanus (lockjaw). In these the cattle operated on are likely to prove immune, but susceptible animals coming on the lands later, by birth or from outside, are liable to suffer and start a new outbreak. Here autotherapy protects the animals on the ground, but efficiency demands quarantine, drainage (drying the land), and, for a length of time, seclusion of the area from other live stock. (4) *Cattle pests that are not self-limiting (self-immunizing).* Here the disease may show itself a second time in animals treated by autotherapy and may spread to other susceptible or new-born animals, the beginning of a fresh outbreak: Poll evil, fistulous withers, foot rot, chronic tuberculosis, deep-seated pus pockets having no sufficient dependent outlet, chronic intermittent bovine dysentery (Johne's disease), cancer, actinomycosis, etc., which, like syphilis in man or glanders in the horse, may persist for months or years in the same animal and steadily infect others. The danger of such a disease is seldom clearly appreciated by the owner because the animal spreading it appears to suffer so little. But in such chronic cases the germ carrier has become largely immune or the deadly germ would have cut him off long before, and his individual invulnerability gives him a long opportunity to spread the germ he bears, and thus to become incomparably more destructive to other and more vulnerable subjects. By this means such splendidly beneficent enterprises as Pasteur's method of immunizing and saving the life of the already infected victim of hydrophobia has, for lack of necessary accompanying precautions, apparently become the means of preserving and spreading the germ of this most deplorable affection to which man and beast are so generally susceptible. From 1868 to 1878 and later mad dogs and hydrophobic men were alike unknown in central New York, while since the Pasteur laboratory was established mad dogs have been common through the country as they were earlier in New York city, and there has been no lack of human patients at the laboratory. The same is true of France, the country made famous by Pasteur's skill. The Pasteur laboratories have failed to extirpate mad dogs or to save people from their bites and canine and human victims have been plentiful in France, while in Great Britain, Australia and other nations, where effective muzzling of dogs is secured, mad dogs and candidates for hydrophobia treatment are alike unknown. It is for the objector to explain why. It is not for us to abolish at once the Pasteur laboratory, but to see that its patients are not allowed to leave the institution and mingle with the general public immediately on completion of the series of injections of the living germ and while that microbe is still alive in their systems. It is equally essential that the strict muzzling of all dogs be enforced (not simply placed on the statute books) until long after the last case of hydrophobia has been effectually disposed of.

In all such cases autotherapy by the sterilized virus is the rational and safe resort.

Tick Fever (Southern Cattle Fever).— In the splendid enterprise of extirpating this by dipping again and again, all cattle in the infected district (embracing whole States) are cleared. But as a means to this end the cattle of a district were driven at regular intervals to a place where the baths had been constructed, dropping there and on the roadways the eggs of the liver fluke (*Distoma hepaticum* and *lanceolatum*), thereby infesting the land, the water and slugs and laying the foundation for a plague of flukes in the locality, a continuous infestment of the farm animals, a depreciation of values and ruinous losses in sheep especially, and only less so in cattle, pigs and other mammals. Similarly, the opportunity was given for stocking the land and water with germs of anthrax, black leg, tetanus and other plagues, the germs of which survive outside the body. See CATTLE-TICK.

Tuberculosis.— The most widely prevalent and intractable plague of animals, largely because it is often concealed through lack of obvious symptoms, through the variety of organs attacked in different animals, so that the victims may appear to be in rugged health and yet continually spread the germ. Many of them can be easily traded off on an unsuspecting customer and will go on unsuspected in the new herd dealing their deadly gift all around, and especially to pigs, through feeding in common or in succession with cattle. In hidden cases germs are preserved in the hard, fibrous tubercle, in the softened and caseated masses and even in partially calcified ones, and, finally, there is no effective legislation nor administration for its suppression. Tubercles appear in the throat, the lungs and their covering, on the inner side of the ribs and spine, on the heart and pericardium, on the generative organs, stomach, liver, pancreas, peritoneum or in any gland or gland group throughout the body (superficial or deep), in bones or joints,

in the brain or its coverings—indeed, anywhere throughout the body. The majority in an infected herd may escape detection unless the tuberculin test is applied to all. The most simple procedure is to put a drop of tuberculin under the lower eyelid in each animal. If next day that eye is red, inflamed and watering while the other eye has escaped, there is good ground for suspicion and all animals showing this should be separated from others and at once, or better, after a week or two, should have a half-dram of tuberculin injected under the loose skin of the neck or side. The temperature of each animal taken just before the test to give a *normal* should be recorded and after eight hours the body temperature should be taken every hour for 12 hours. Any rise above the *normal* from 103.5° to 106° F. would condemn any subject that had also showed the congested eye. All such should be killed if the aim is to stamp out the disease. The cow-stable should be disinfected with good, fresh bleaching powder, together with mangers, racks and drinking troughs. The remainder of the herd should be tested yearly or half-yearly and reactors removed and killed.

In case of thoroughbred *reactors,* valuable mainly for their high-priced calves, they may be kept in thoroughly secluded premises and well-fenced pastures, their calves should be taken from them as soon as born and brought up on the milk of sound cows (or on their dams', first thoroughly sterilized by boiling). Such calves should be kept rigidly apart from other animals, in disinfected premises and safely fenced pastures. They should be tested when one year old.

Protozoa are microscopic (or ultramicroscopic) animal parasites, as bacteria are minute vegetable parasites. Some diseases, above referred to, are caused by protozoa in the blood, lymph, tissues and liquids of the host, and others, especially the ultravisible, have been suspected of belonging to this class; blackhead in the turkey and the cluster masses of cells (*Coccidia*) on the skin and in internal organs of birds and mammals, amœbæ of the intestinal contents, pirosoma (piroplasma) of Texas (tick) fever and the small piroplasma of the Rhodesian East Coast tick fever. Suspected of being protozoa are the ultravisible germs of hydrophobia, hog cholera, foot and mouth disease, lung plague, rinderpest, cowpox, sheep-pox, contagious cerebro-spinal meningitis, chicken pest, contagious epithelioma, etc. Some of these have been treated by weakened germs (unsterilized autotherapy), but where they are extremely fatal and controlled very uncertainly by the *mitigated virus* it is more rational to employ the sterilized germ, blood and *antitoxins,* etc. (sterilized autotherapy), rather than to run the risks of mistaken diagnosis and the resulting introduction of an unknown disease.

A widespread family of pathogenic protozoa (*Tripanosoma*) have eel-like, mobile bodies, with a delicate undulating membrane at one side running into a fine antenna at the tail. They are found mainly in the blood and animal fluids, but also in the tissues, and can live outside the body. They are found mostly in warm climates, but have no difficulty in surviving our North American winters when domiciled in a warm-blooded host, as in the case of the breeding paralysis of horses, which has assumed a place in our studs. This demands castration of both males and females when affected and remanding them to work service by themselves. A progressive anæmia is common to all forms of tripanosomasis. They are largely carried from victim to victim by predatory flies. Hence they can be checked to a large extent by destruction of insects.

Larger Parasites.—These are usually large enough for recognition without the microscope. Like the microbes they are amenable to control or extinction in a district or country, thereby extirpating the diseases which they respectively cause. Each parasite must, however, be dealt with on the basis of its own genus and life habits.

Vegetable Parasites.—The cryptogams (non-flowering) are allied to bacteria but larger, often quite visible to the naked eye. Fungi attacking the skin, hair, hair-bulbs and follicles are common in cattle, especially about the head and neck, showing as circular masses of scurf with loosening and dropping hair, leaving bare patches (ringworm). Microscopic examination shows fine filaments and spores, and the bare patches enlarge by extension around the edges. These are unsightly, but not deadly, and can usually be checked by pulling out or shaving the hair and applying tincture of iodine or an alcoholic solution of bluestone, repeating this daily. Another filamentous fungus of a snowy whiteness (Fusarium) attacking the skin of domestic animals (including cattle) is overcome by sulphur or coal tar ointment. Thrush of calves' mouths with formation of a filamentous, curd-like accretion, as in children, is to be treated by boric acid or chlorate of potash (powder or solution). The aspergillus of the air passages in mammals (including cattle) causing wheezy cough and breathing, fever and general disorder and an eruption on the bronchia, lungs, pleura, etc., at first as if sprinkled with water, but later with nodules and caseated masses filled with filaments and spores, and death as in acute tuberculosis, is to be met with antiseptics such as fumes of sulphur and alcohol burning in a close room till it causes cough, and repeated two or three times a day. A solution of bisulphite of soda may be injected into the windpipe. The walls of the building should be cleaned and thickly coated with a watery solution of bleaching powder.

Animal Parasites.—Two-winged flies (*Diptera*), larva in wounds: The most prevalent and persistent enemies are the common house flies and near allies, which are not blood suckers. Without perforating stylet they suck off the scurf-skin so as to leave raw surfaces and make spreading sores. The horn fly is a familiar example of this. The maggot-like larvæ, like those of the blood suckers, live in almost any decaying organic matter (animal or vegetable) that attracts by its fetid odor. Suppurating wounds and sores attract them and the ravenous larvæ add to the sores in depth and width. These are particularly destructive in sheep infested with intestinal worms and scouring, so that the liquid discharges matting the wool make a special protection and feeding ground for the maggot. The blood suckers are, however, the most irritating by drawing the blood through the stylet; they often transfer the most dangerous diseases, an

evil that is not unknown in the case of the flies that suck only. Botflies pass their larval stage mostly subcutaneously in cattle in spring (in fall and winter they are usually near the gullet, being apparently licked in from the skin by the barbed tongue and swallowed). When numerous they do much damage to health and hide, the loss rising to $15 a head. These grubs should be squeezed out and crushed in early spring to head off the next year's crop.

Mosquitoes and *Small Black Flies* deserve mention. Their bite is venomous and they may besides implant in the wound the germ of another disease from the blood of the last victim. It is common to cover drinking water by a film of kerosene to destroy their larvæ (wrigglers).

Fleas are common enemies and carry disease. Some carry larva of tapeworms to their next victims; others infections. The tropical burrowing flea gets under the skin, forming a hatching nest and suppurating sore. The eggs, larvæ and pupæ hide in furniture, clothing and even on filthy skin where they can find decaying organic matter for sustenance. Keep buildings scrupulously clean, boil clothing and use freely insect powder, creolin, laurel oil, tar water and even sticky paper to catch the offender in his leaps. *Lice* are among the most widespread and health-destroying pests. Cattle harbor two kinds, blood suckers and biters. Blood suckers prefer parts covered with long hair and best out of the way of the tongue (head, neck, back, tail). Itching leads to persistent rubbing, and hairless patches indicate the invasion-areas. The safest remedies are weak tar or tobacco water, decoction of hellebore or stavesacre and naphthalin, though the latter will taint the milk. A second dressing is due in eight days to destroy the new crop hatched from the nits in the interval. *Ticks* and *Mites* are eight-legged insects (larva has but six legs), and form large classes, always injurious when attacking in numbers, which they do on the skin or in internal cavities. They develop through four successive stages: eggs, larva (hexapod), nymph (octopod) and mature. The larva attacks the mammal and lives on it until mature. Some ticks (*Argus*) generate a deadly venom and instil it into the victim. All produce some irritation and swelling where they bite. But they do most harm by transferring deadly infections and infestments from animal to animal, as in Texas fever, which long prevented the success of cattle industries in the South and created one of the most deadly epizootics when taken North. This last tick is now being exterminated in State after State in the South, though with imperfect precautions to prevent diffusion of other diseases, like anthrax, black leg, flukes., etc.

Mites like ticks can carry infection, though in its absence they usually depreciate health, condition and value by irritation. The harvest mite of a dull red color, and an European one of a brilliant crimson, produce great irritation for several days, or continuously if the victim goes daily through vegetation. Protection is sought by indoor life, by solutions of tobacco or hellebore or by sulphur.

Scabies in man, *Mange* in cattle are due to any one of various Acari, the burrowing ones (Sarcoptes from *Sarx* flesh) boring into the skin or sweat-glands, and the others living on the surface, under scurf, scales or scabs. (Psoroptes Psora itch and Symbiotes live together). The mange acari are very prolific, reaching 7,500,000 from a single pair in six generations, 60 days. They can be treated by sulphur or hellebore ointments, naphthalin, potassium sulphide or by simple oil inunction —the oil being applied to the right and left sides of the body on alternate days. *Tapeworms.* These are flat worms consisting of a succession of segments the first of which bears the small head with four suckers on the corners, and a proboscis in some species bearing hooks for attachment to the mucous membrane. Each segment is bisexual, and when mature is a mere bag of eggs. The embryos hatched out, each bores its way into the tissues of its new host, forming the bladder worm or scolex, and the next host devours the scolex which then grows into the mature tapeworm. If it fails to enter a suitable host it perishes. But the two hosts usually live in numbers close together, and as each feeds on the products of the other, it follows that the worms multiply so as to cause most deadly plagues in flocks and herds. Cattle harbor in the bowel the following tapeworms: the serrated tapeworm, unarmed, 8 to 15 inches long and ¼ inch broad; the broad tapeworm, unarmed, 12 to 18 feet long, segments showing a waving posterior border; the white tapeworm, 18 inches to 7 feet long, 10 to 12 mm. broad, unarmed; in tissues, the narrow-necked tapeworm (diving bladder worm) which becomes the mature Tænia Marginata in the dog; the Cœnurus Cerebralis (rather rare) in the brain which passes into the Tænia Cœnurus in the dog, and the Echinococcus Cyst which is the Tænia Echinococcus in the dog. Echinococcus being a well-known disease in man, to the ox belongs the odium of forming a link in the chain of its survival. Treatment: after a few days' fast give powdered male shield fern or areca nut, ½ to 1 oz., to the host of the mature tapeworm with an active purgative (Epsom salts 1 to 2 lbs.).

Liver Flukes (Distoma Hepaticum), ¾ to 1 inch long, and *Lanceolatum*, ⅓ inch long, are flat, leaf-shaped parasites found in the gall ducts of cattle or of other domestic animals, and the latter of man, near ponds, swamps and wet lands, where there are fresh water snails that harbor the undeveloped fluke as a sporocyst. The successive stages of development in the fluke are: (1) The egg in the droppings of the host; (2) the embryo, a flat organism, like a microscopic fluke in fresh water; (3) the Sporocyst in a fresh water snail; (4) the Redia again floating free in water; (5) in summer often Daughter Redia; (6) in autumn, Cercaria encysted on stems of water plants; (7) these grasses being eaten by mammals the flukes are set free by gastric digestion and pass into the first intestine, and thence into the gall ducts to form the mature flukes. It seems as if the risks of such a long chain of changes would arrest the increase or even annihilate the fluke, but in wet soils with abundance of fresh water snails, and heavy stocking with sheep, cattle or swine, the parasite prospers and multiplies, and the fluke plague is constantly increased and extended. The victims lose condition, become anæmic and weak, dropsical in lower parts of the body and internally and die. Prevention is not to be sought

by withdrawing all stock from the land when the products of the soil are so precious. Thorough drainage is the true alternative and until the land is well dried the cattle and sheep may be confined to dry areas or indoors, by the disuse of all fresh water supplies, the charging with sea salt of all retained drinking sources, the adoption of silos and well-salted ensilage, or well-salted dry food when ensilage is not in use and the liberal salting of all retained pastures (as far as possible without stopping their growth). These are the fundamental precautions needed. The 30,000 eggs deposited at one laying of the fluke constitute a terrible risk if any loopholes are left. Every precaution must be taken to see that no fluke-infested animal can escape to spread the pest on wet lands as yet free from its curse. A census of fluke carriers may be kept and the victims restrained from traffic (except for immediate slaughter on the premises) unless first cleared of the parasite. Even the gathering of live stock for sale, market or for some other sanitary object, though called under government control, cannot palliate the evil done or rendered possible. Frogs and toads have been cultivated in the waters of Hawaii, and carp in the Columbia River, to combat successfully the snails and slugs that form such an important link in preserving this parasite.

Other flukes found in the first stomach and intestines of cattle have rarely proved especially injurious. It is different with the Bilharzia Crassa which produces white, albuminous urine in man, and is charged with causing Epizoötic Hematuria in cattle. The giant-fluke of lungs and liver of sheep and cattle encysts itself, causing dark red nodules. Fatal results are common when they are numerous. Prevent and treat as for other flukes.

Round Worms.— These are cylindrical, have true digestive organs and the sexes in two separate individuals. Some produce live young, some through eggs laid, some like *Trichina* pass their immature life in one host, which being eaten by another goes on to maturity in the latter; others pass through both stages in the same host; some again pass immature life in water outside the mammalian host. Cattle harbor from 15 to 20 species of round worms, a number of which spend their entire life in one host and leave their progeny in the same for the next generation. Some therefore must be treated with vermifuges given to the host, others may have their career cut short by removing the intermediate host that harbors the immature parasite, or the water which favors the survival of the young worm outside. Great factories flourish on medicine intended to destroy the mature worm in its mammal host, which is too often but a closure of the spigot to let the vessel gush at the bung-hole. Worms resemble contagious diseases in this, that they must be destroyed both outside and inside the host wherever found. Much depends on where in the body the worm makes its habitat. If in the solid tissues or even in the blood, it is less effectively reached by medicine; if in the lungs gases and vapors (non-poisonous to the host) are often the most promising agents, and even in the case of worms living free in the bowels, the multiple stomach of cattle and other ruminants endangers the dilution and weakening of the drug to an extent that is not met with in the small simple stomach of horse, man and other non-ruminating animals. All round worms living in the alimentary tract impair digestion and absorption of the foodstuffs by their movements and the consequent irritation, as well as by consuming of nutriment needed by the host. The bloodsuckers irritate still more by the many punctures and undermine the health by the amount of blood extracted. Some even secrete poisons that destroy the blood functions, or even break down blood globules and with them health and vigor. The eggs of many worms fall with the excretions and live in the soil or in water for a year, so that on pastures they are liable to continuous increase, unless all hosts of that worm are excluded for years, or, better, unless ploughed up and put under cultivated crops for years. Among round worms living in the tissues of cattle may be named a hairworm inhabiting the eye and the serous cavity of the abdomen; the encysted trichina in muscles (rare in cattle); a hairworm in beautiful zigzag lines in the mucous membrane of the gullet and many embryo worms in the blood. Among those living in the bowels: one whipworm in the blind gut; one Ascaris (like an earthworm) in the small intestine; five strongles (round) large and small, in the bowels (very irritating) and one hookworm (very injurious): in the air passages, 2 strongles giving rise to husky paroxysmal cough and much loss of condition, with expectoration containing worms: in or near the urinary organs the giant strongle (very harmful).

Intestinal Worms are liable to cause irregular bowel motions, costive or loose, unthrifty skin and a fur around the anus from dried-up mucus. The worms can often be seen in the droppings. As prevention change herd in pasture (horses or swine for cattle), change of water if from a running stream with herd above; feed liberally of salt, give a course of finely powdered copperas, areca nut, naphthalin, quassia water, wormseed or other vermifuge. For hookworms give thymol and be careful to prevent the embryos entering through the skin from the infested soil.

Non-contagious and Constitutional Diseases.— These are not self-propagating nor pestilential and thus make less appeal to the public. They are due mainly to generally operating causes — climatic, dietetic, chemical mechanical, electrical, pluvial or otherwise unhygienic. They are to be prevented by subjecting each individual in sound health to the conditions that stimulate the healthy bodily functions so as to maintain a normal equilibrium. This would include good air, ample but well-balanced diet, regular exercise, never to extreme exhaustion, the avoidance of all chemical poisons whether originating inside or outside the body, and of all mechanical injuries that would in any way impair bodily functions. Yet there may at any time occur a combination of contagious or parasitic disease on the one hand and a sporadic disease on the other, so as to demand a common consideration of the two. A bodily impairment or debility resulting from a contagion or a parasite may make a subject more susceptible to the injurious action of cold and heat, humidity or dryness, electric action or impure air, than would other-

wise have been the case, and on the other side an injury due to cold or heat, etc., may unbalance the functions and system so that a microbe may meet with less resistance when it attacks the enfeebled body. Thus it is often needful especially to guard a patient suffering from a sporadic disease from the danger of infection and the victim of a plague from any disorder due to defective hygiene or care. It becomes desirable to employ autotherapy in the complex malady, along with the standard treatment for the sporadic affection present.

Inflammation is a vascular and nutrition reaction of any tissue to an irritant, and shows a contraction followed by a distension of the capillary vessels, an increased and somewhat depraved action of the tissue cells and an exudation into the affected and adjacent structures, or even into an internal cavity, of a liquid (lymph) and even blood, also a deranged nervous control. It may kill or it may result in tissue changes of many kinds — death of the part from exclusion of blood, formation of new tissue, the formation of pus (abscess) and various degenerations.

Fever is a reaction, marked by an increase of body temperature, derangement of the nervous heat-producing centres, and of secretions generally, scanty high-colored urine of increased density, costiveness, dry skin, etc. It attends on all acute extensive inflammations, rises and falls with them, and leads to many derangements and degenerations.

Treatment of Fever and Inflammation.— Up to a given point a general system of treatment can be laid down. The profound changes in the blood, the excess of fibrin and its encreasing coagulability, increase of white cells, enzymes and other poisons produced in the inflammatory and febrile processes, from the fermentations in the torpid bowels and elsewhere, and from the altered products and suspended secretions of glands, especially of the kidneys and skin, and from the generally altered functions of the body cells, the system is charged with deleterious material. This can be to a large extent arrested or counteracted by a dose of laxative medicine (1 lb. Epsom salts) which will clear out the mass of fermenting materials from the bowels and of fermented product even from the blood and system at large. If the already-formed poisons have given rise to diarrhœa this may be omitted or given in smaller doses, until the bowels and system have become more normal. With the bowels cleared, saltpetre may be usefully employed (½ oz. twice a day) to lower heart action, increase the discharge from the kidneys and eliminate from the blood much injurious morbid product. Short of this the free use of water to drink will do much to activate both kidneys and skin, lowering body heat, and expelling and diluting the poisons. When body heat remains very high (103° F. and +) aspirin (2–4 drams in ball) increases kidney secretion and is especially useful in rheumatism, acetanilid (1–2 drams) or phenacetin (2–4 drams) may be given. A simple course is to give pure cool air and water, clothing if chilly, and even damp compresses covering the affected region or even the whole trunk. The skin over the region of the affected throat, lung, kidney or other part becomes nervously susceptible and even tender, and the application of warmth relaxes and soothes the deep-seated, inflamed part. The effect is still better if a damp compress is applied, warm if the animal is cold, but cold if the surface is burning hot; it should be well wrung out so as not to drip, and at once covered, closely at all points, by a dry blanket or bandage sufficiently thick to prevent too sudden evaporation of the water and chilling of the skin. It must be a mode of applying warmth and thereby soothing. The good effect may be secured in other ways — by active friction to the skin, by rubbing actively with stimulating, essential oils, by an electric pad or by detaining the blood for an hour in the skin and then setting it free again. This was formerly effected by cupping. Chase most of the air out of the inverted cup by heating it with a taper; withdrawing the taper, suddenly apply the mouth of the empty cup on the skin over the affected part, and hold it there until it cools, increasing the partial vacuum, drawing the skin up into the cup, and the blood into the skin. Apply cups over an area corresponding to the size of the organ affected, and allow them to stay on for an hour. Then they can be taken off by separating the cup from the skin at one side and admitting air, when the blood will resume its original flow and pass out into the system. Biel's modern plan of enveloping an extended area of skin or a whole limb in a rigid, close-fitting cover and exhausting the air is essentially the same in principle. Both alike avail of the autotherapy method, for the blood coming with a ready-prepared charge of toxins and defensive products from a microbian, inflammatory and febrile source is held for a time semi-stagnant in direct contact with healthy, active body cells until even more fully charged with the defensive materials evolved from these under the most appropriate stimulus and is then sent back to carry out its recuperative work in the system at large. Similarly, blistering unconsciously availed of this source of defense and often with excellent results. In diseases of bones and joints even the hot iron judiciously applied will often work wonders.

Softening of Bones (rickets), seen in calves of cows kept on soils rich in organic matter, but deficient in earthy salts, on high, cold, exposed areas and on damp, stormy seashores, is essentially due to a fault of diet and nutrition and must be met by a richer ration, especially by change to land having an abundance of lime and other phosphates and salts. Tonics are usually necessary as well.

Rheumatism, attacking bones, joints and other fibrous structures, also claims cold, wet and exposure as an immediate cause, but may be traced as well to an excess of acid in the system or in the food, to defective nutrition, overfeeding with deranged digestion and even local injuries. Warm, dry buildings, dry soil, sunny pastures and more careful feeding are demanded. As a direct anti-rheumatic, salicylic acid or salicylate of soda in full doses daily is desirable, together with active friction over the part affected with a liniment of oil of turpentine and salicylate of soda.

White Cell Blood, with or without Enlarged Lymph Glands (Leukemia; Lymphadenoma).— In this there is a marked increase of white or lymph cells in the blood, in the marrow of cancellated bones, the spleen and the liver, and,

still more marked, by the presence of abnormally large white cells with pale nuclei. Bone marrow and lymph and other glands are the great producers of white cells, and these are liable to be enlarged in one form of the disease (*Lymphadenoma*), showing nodular swellings around the throat, in front of the shoulder and stifle and back of the latter. The cattle lose condition and run steadily down. Other conditions (notoriously hookworms) leading to enlargements of such glands may cause Leukemia. Bitters (quassia, gentian, quinine) with iron and arsenite of soda solution will often have a good effect.

Progressive Pernicious Anæmia.— This is seen in cattle on mucky or otherwise defective soils, confined indoors or out in poor pastures, and preferably from three-fourths to one year old. No visible microbe has been clearly demonstrated. Subject loses condition rapidly even though liberally fed, has a dull yellow tinge of the eyelids or of white ears, pulse 70 to 80 and a hissing (anæmic) murmur with the first sound of the heart. Blood globules are often modified or deformed. Temperature may be normal or subnormal. Blood spots may show on the eye before death, in two or three weeks. May advance more quickly after calving. Mortality 50 per cent. Treat as in leukemia.

JAMES LAW,
Emeritus Professor of Veterinary Science, Cornell University.

CATTLE FEEDING. See NUTRITION OF FARM ANIMALS.

CATTLE-PLAGUE, any plague by which large numbers of cattle are destroyed. Such plagues have existed at intervals, more or less, in all countries and in all ages. Among the severer visitations in centuries preceding the 19th may be mentioned a great plague which arose in Hungary in 1711, whence it spread to other countries, destroying in the next three years about 1,500,000 head of cattle. A second visitation, which affected England and the west of Europe between 1745 and 1756 caused the death of 3,000,000 cattle. See RINDERPEST.

Several of the diseases of cattle are due to insects, including that called "pleuro-pneumonia" or "Texas cattle fever," which is caused by a blood-inhabiting sporozoon that is carried by ticks from an infected animal to a healthy one, communicating the disease. Cattle bred in the Southern States have become practically immune, but the disease affects and kills northern cattle. The natural limit of the tick concerned (*Boophilus annulatus*) nearly coincides with Mason & Dixon's line, and Federal laws prohibit the shipping north of any cattle from south of this line, except between 15 November and 15 February. Other species of this same genus of ticks transmit similar cattle diseases in various parts of the world, especially the "blue tick" (*B. decoloratus*) of South Africa. The remedy is to dip the cattle in vats of cotton-seed oil or some similar mixture. (See CATTLE-TICK). The appellation "cattle-plague" is also loosely given to another disease among cattle in the United States, which is otherwise known as "lumpy-jaw," a most virulent and incurable affection. Experiments have been time and again ineffectually tried to find a cure for this, though large governmental encouragement has been offered. A rigid examination of cattle is made by government inspectors at all receiving and shipping ports. See CATTLE, DISEASES OF.

CATTLE-TICK, or **TEXAS-FEVER TICK,** an arachnid (*Boophilus annulatus*) related to the mites, and prevalent in the western and southwestern States. It is a reddish, coriaceous, flattened or swollen creature from a quarter to half an inch in length. The cattle-tick lays a great many eggs, nearly oval, dark-brown, coated with a hard secretion, the process of egg-laying lasting for several days or a week. The young tick, on hatching, is whitish, afterward turning brown; it has three pairs of legs. After molting it becomes a nymph, when the fourth pair of legs is added. During the nymph stage the reproductive organs develop. After another molt it becomes sexually mature. It completes its development from the larva to the adult on cattle. After this second molt the couple pair, and the male grows but little. The female, voraciously feeding on the blood of her host, grows to a gigantic size, her body swelling and becoming gorged with blood and eggs. The males can be easily detected by their smaller size, and by the extension of the shield over the entire back. Ticks live upon the blood of their host. The females, as they increase in size, store away quantities of the ingested food in an immense convoluted chamber or appendage of the stomach. In summer only three or four days after the final molt are necessary for the ticks to become large. When fully gorged, and the eggs fertilized, the female loosens her hold in the skin of her host, and falls to the ground, where she lays her eggs, after which her body contracts, shrivels up and then dies. The young ticks get access to cattle by climbing bushes, whence they reach out and attach themselves to passing animals.

It has been proved that ticks, by sucking the blood of cattle infested with the Texas fever germ, which is a sporozoon (*Apiosoma bigeminum*), may communicate the disease (bovine malaria) to healthy cattle, just as the sporozoon blood-parasite of yellow fever, or of malaria, is communicated by a mosquito (*Anopheles*). In dealing with ticks it should be remembered that it breathes by spiracles, or minute holes in the sides of the body. By the use of oil, or any greasy substance, those openings may be covered, thus asphyxiating the creature. The ticks may thus be killed by dipping or spraying the cattle with cotton-seed oil. Cattle should be kept away from wooded or bushy pastures. Rotation of pasture is also used by stock farmers, so that the tick may die of starvation. The United States Department of Agriculture has conducted the work of eradicating the cattle tick from the southern States in co-operation with the States affected. A total area of 275,782 square miles had been made free of this pest up to 1 July 1915.

There are one or two forms very closely allied to the Texas cattle-tick, and named *Boophilus australis;* they are regarded by experts as either distinct varieties or species from *B. annulatus*. They transmit the cattle-fever in the countries above named. Another subspecies or variety, the blue tick (*B. decoloratus*) in South Africa transmits the same disease in that region.

The Lone Star tick (*Amblyomma unipuncta*) is, next to the cattle-tick, to be held responsible for the transmission of the Texas fever. It may be recognized by the simple bright silver spot on the back.

Bibliography.— Curtice, 'The Cattle-Tick' ('Journal of Comparative Medicine and Veterinary Archives' 1891–92); Salmon and Stiles, 'Cattle-Ticks of the United States' ('17th Annual Report of the Bureau of Animal Industry,' Washington 1902); Law, James, 'Text Book of Veterinary Medicine' (Ithaca 1911); Hutyra and Marek, 'Special Pathology and Therapeutics of the Diseases of Domestic Animals' (Amer. ed., by Mohler and Eichhorn, Chicago 1912); and 'Special Report on Diseases of Cattle' of the United States Bureau of Animal Industry (rev. ed., Washington 1912).

CATTLEYA, a genus of orchids, including about 40 species, natives of tropical America. The species are the showiest of all orchids and are the plants best known under this name, being widely grown by florists. In their native haunts they are epiphytic upon the trunks of trees. Innumerable hybrids and horticultural forms have been produced by plant breeders.

CATTY, the name given by foreigners to the Chinese kin or pound and used also in the Malayan Archipelago. In China, the Straits Settlements, Java, British North Borneo, etc., it is approximately one and a third pounds. The Siamese catty is equal to 2.675 pounds. In Burma, it equals one and a ninth pounds.

CATUBANGANES, kâ-too-bän-gans', or **CATABANGENES,** warlike tribes settled in the mountains of Guinayangan, in the province of Tayábas (Luzon, Philippines). Nothing is known about their origin or habits, whether they be pure Malay or Negrito-Malay. They are probably Remontados mixed with Negrito blood and gone wild.

CATUBIG, kä-too-bïg', Philippines, a small town in the island of Samar, 48 miles north of Catbolagan. The place is garrisoned by United States troops, who, in June 1900, withstood an attack by 600 insurgents. This episode was a stirring incident of the war. It exports abacá fabrics to Manila. Pop. 9,565.

CATULLUS, Gaius Valerius, Roman poet: b. Verona 87 or 84 B.C.; d. probably 54 B.C. He is deemed by some to be Rome's greatest lyric poet, by others to be second only to Horace. His family seems to have had social standing and at least moderate means; for his father often entertained Julius Cæsar, and the poet apparently never had to earn his living. While still a youth he could go to Rome and there complete an excellent education. It was in the expensive metropolis, too, that he chiefly resided, although his native town and his villa at Sirmio on the Lago di Garda, and another not far from fashionable Tivoli, would from time to time claim his presence. His one trip abroad may have been a financial venture, but it was perhaps mainly to visit the storied cities of the East that he joined the staff of Memmius, who governed Bithynia in 57–56 B.C. The provincials proved too poor to yield profit even to an unscrupulous official, much less to one of his suite, and Catullus vented his spleen in lampoons that contrast strikingly with the eulogies of the other great contemporary poet, Lucretius, who revered Memmius as his patron. Catullus' trip did, however, allow a visit to the grave in the Troad of his only brother. His expressions of inconsolable grief are among the most affecting in Latin literature. In lively contrast are the two inimitable poems that voice his joy at returning home. The year's absence had at least quenched the last embers of his passion for Lesbia, who had been for some years the curse and inspiring genius of his life. According to the generally accepted theory, Lesbia is his pseudonym for perhaps the most remarkable woman of the day, Clodia, the sister of Publius Clodius Pulcher. She was at least 7, and perhaps 11, years older than Catullus, and in 61 B.C., when he fell in love with her, was the wife of Metellus Celer, a consul-elect. Apparently even Cicero did not wholly escape the fascination of this beautiful though utterly dissolute queen of the Roman "fast set." The course of the poet's liaison may be traced in a series of poems that expose his inmost feelings with a power and vividness that critics deem almost unequaled. To the period of difficult courtship belong madly passionate lyrics and the dainty "sparrow-songs." Next a lovers' quarrel and reconciliation engage our sympathies. Soon, however, the poet's faith in Lesbia's fidelity wanes, and with it all purer love, although his passion grows only the wilder and more intense. The poems in which he assails successive rivals, beginning with the brilliant but disreputable Cælius Rufus, are marvels of invective. It is only after his return from Bithynia that Catullus seems fully to appreciate the hopeless infamy of his former mistress, when he sends a scalding reply apparently to a proffer of reconciliation. While it is this cycle of love poems that has immortalized Catullus, he wrote admirably on other subjects. In spite of a life of pleasure, he had energy to study thoroughly the early Greek lyric poets, and especially the technical achievements of the Alexandrine school, which began now to have great influence upon Latin poetry. Although some direct translations from the Greek also attest his interest in these models, Catullus remained peculiarly independent. No matter how much his lyrics may show the results of his studies, they were primarily an outlet for feelings that compelled utterance, and not, like Horace's odes, a purely intellectual performance. He is less original in some of his long poems. The longest is an epithalamium, in Alexandrine style, upon the wedding of Peleus and Thetis, introducing also the story of Theseus and Ariadne. While Catullus' work in mythological epic no doubt made that of later writers, including Virgil, easier, his daring dithyrambic poem on Attis has remained unique. On the other hand, his epithalamia are the forerunners of others in Latin literature, as also of the marriage poems of Spenser, Jonson and Herrick. Horace also often appears in his odes the older poet's debtor, though in artistic form his superior. In epigram Martial is ready to concede the palm to Catullus as well as Marsus, though himself the acknowledged master of that form. Furthermore, in the leading elegiac writers, Tibullus, Propertius and Ovid, we clearly see their obligations to Catullus and often read his praises. He enjoyed, too, the admiration of contemporary writers, and not alone those of

his own school of poetry, like Calvus and Cinna; for the historian Nepos seems to have started him auspiciously in his literary career. To him he gratefully dedicated a partial edition of his poems. Other famous Romans that receive kindly mention are Asinius Pollio, Hortensius, Cicero's great rival in oratory, and Cicero himself. Cæsar, however, is attacked with a fearlessness as amazing as the language is shocking. But in judging Catullus' obscenities, his liaison with Clodia, and other even less creditable relations, moderns are charitable in proportion to their knowledge of the standards of that age. Even the severest are won to sympathy, if not affection, by happier glimpses of the poet's character. In an age of insincerity every word of his rings perfectly true. His gentler side appears in his verses on babies, flowers and the beauties of nature, in his affection for his brother and his friends, and even in the better aspects of his love for Lesbia. Besides the English poets already named, Prior, Gray, Byron, Landor and Tennyson have shown especial admiration of Catullus. Among numerous excellent editions of the poet, the text edition of Ellis (Oxford, Clarendon Press, 1904) may be named; also the editions of Bährens (Leipzig 1885); Merrill (Boston 1893); and Friedrich (Leipzig 1908). Besides the commentary by Ellis (second edition 1889), the English reader has the poetical translations of Theodore Martin (1861), those in prose by Francis W. Cornish (Cambridge University Press 1912), and, perhaps, best of all, Hugh Macnaghten's 'The Story of Catullus.'

WALTON BROOKS MCDANIEL,
Professor of Latin, University of Pennsylvania.

CATULUS, the name of several distinguished Romans. 1. GAIUS LUTATIUS CATULUS, the admiral whose fleet defeated the Carthaginians near the Ægates Insulæ, off the Sicilian coast in 241 B.C., thus closing the First Punic War. 2. QUINTUS LUTATIUS CATULUS, Roman general, historian and poet: b. about 152 B.C.; d. 87 B.C. He was consul in 102 B.C. with Gaius Marius, and in the following year was proconsul. During his proconsulship he, with Marius, defeated the Cimbri near Vercellæ, the modern Vercelli, in northern Italy. As one of the aristocratic party and a partisan of Sulla, he was proscribed by Marius. With the exception of two epigrams nothing of his work has survived. 3. QUINTUS LUTATIUS CATULUS, son of the preceding, consul in 78 B.C., censor in 65. He quelled the revolutionary uprising of M. Æmilius Lepidus, his colleague in the consulship (78), who had tried to overthrow Sulla's constitution, and assisted Cicero in the prosecution of Catiline.

CAUCA, kow'kä, Colombia, one of the nine departments of the republic, bounded on the northwest by Panamá; on the north by the Caribbean Sea; on the east by the departments of Bolivar, Antioquia, Tolima and Cundinamarca, and the republics of Venezuela and Brazil; on the south by Brazil and Ecuador; on the west by the Pacific Ocean. The territory of Caquetá and the districts of Huila, Inzá and Páez are included in this department. The eastern part of Cauca is watered by the Amazon and some of the affluents of that river; the Guaviare and the Casiquaire flow into the Orinoco; the Atrato empties into the Gulf of Urabá; while a dozen smaller rivers flow into the Pacific. On both the Caribbean and Pacific coasts there are several ports. Its original area was 31,388 square miles, but in 1905 was reduced to 20,403 square miles. The centre of population and cultivation is along the Cauca River Valley, where corn, sugar cane, cacao, tobacco, etc., are grown with success. The mineral wealth, especially gold and silver, is extensive. The forests, which cover a large section of the department, yield large quantities of rubber and cinchona. Pop., including aborigines (1912), 211,756. The capital is Popayan, with a population of 18,724.

CAUCASIA, that division of European Russia lying in the extreme southeastern part of the empire (38°–46° 30′ N.), between the Black and Caspian seas, and bounded on the south by Asiatic Turkey and Persia and on the north by the provinces of the Don Cossacks and Astrakhan. It covers an area of 180,843 square miles and is divided into two separate divisions by the Caucasian Mountains, on the north by Cis-Caucasia, on the south Trans-Caucasia. The physical features are greatly diversified and present an irregular succession of mountains and valleys, table-lands and plains, making description extremely difficult. The central section of the country is one vast mountain-top, 700 miles in length and covering an area of over 12,000 square miles. From the range of mountains the plains of Cis-Caucasia on the north gently slope, ending in the Steppes, a low, marshy country; throughout Trans-Caucasia on the south are chains of mountains running parallel to the central range. The Kuma and Terek rivers, flowing into the Caspian Sea, and the Kuban River, flowing into the Black Sea, drain the northern section, while the southern part is drained by the Kur and the Aras, its affluent, emptying into the Caspian, and the Rion, leading to the Black Sea. The much smaller Rion flows into the Black Sea. The water system of Caucasia belongs wholly to the Black and Caspian seas. Lakes are found only in Trans-Caucasia. The chief of them is the Gotchka, or Sevanga, situated in Erivan. Agriculture is the most productive occupation of the settled inhabitants of the southern section, the principal crops being wheat and other cereals, cotton and tobacco. In Cis-Caucasia cattle-breeding is the principal industry and wheat, rye and other grains give large returns in the irrigated districts; while in the mountainous regions mining is carried on to a great extent, the mineral deposits being very rich, copper, silver, iron and magnese ores, cobalt, sulphur, quicksilver, naphtha and rock salt the most important. The region is especially rich in oil, the production of petroleum being very extensive and second only to that of the United States. Coal, of inferior quality, is extracted. About 30,000,000 gallons of wine are produced yearly. Rugs, woolen goods and harness are also made. The exports and imports are rapidly growing, the exports, valued at $30,000,000, being about six times the value of imports. The transportation facilities are far from adequate. In many parts the pack horse is still used for transporting freight. The northern of the two chief lines of railway extends along the Caspian coast from Baku to Petrovsk; thence inland and north into the

province of the Don Cossacks to its terminations at the Sea of Azov. A branch connects the main line with Novorosiysk on the Black Sea. The southern line connects Baku, on the Caspian, with Batum and Poti, on the Black Sea. For higher education there are about 200 schools accommodating 27,000 pupils. There are 5,443 primary schools with 90,000 pupils under the Ministry of Education and 19 secondary and 1,308 primary schools with 56,000 pupils under Cossack supervision, besides numerous religious schools. The majority of the people attend the Greek Orthodox Church, but there are large numbers of Nonconformists, Gregorians, Lamaists, Mohammedans, Buddhists, etc. The territory is governed by a general governor, acting for the emperor, and the local zemstvos administer the economic affairs of their respective districts. Caucasia is divided into 11 separate governments: on the north are Terek, Kuban and Stavropol; on the south are Tiflis, Kars, Kutais, Erivan, Daghestan, Black Sea, Yelizavetpol and Baku. Prior to 1770 historical information is vague, but by the end of the 18th century Russia had acquired Cis-Caucasia, and by 1829 the whole territory was nominally under Russian dominion. Not until 1865, however, could it be said that Russian power was firmly consolidated. The Russo-Turkish War of 1877–78 resulted in the annexation of a considerable portion of Turkish Armenia. In 1905 Caucasia was the scene of violent disturbances, racial and revolutionary. The inhabitants are mainly Russian Armenians, Tartars and Georgians, about 68 dialects being spoken. Pop. (1911) 12,037,200. Consult Keane, 'Man: Past and Present' (1899); Ripley, 'Races of Europe' (New York 1899); Erckert, 'Der Kaukasus und seine Völker' (Leipzig 1887); Freshfield, 'The Exploration of the Caucasus' (London 1902); Wirth, 'Kaukasische Zusammenhänge' (Leipzig 1907).

CAUCASIAN, kô-kā'shạn, **RACE**, a term introduced into ethnology by Blumenbach, in whose classification of mankind it was applied to one of the five great races into which all the different nations of the world were divided. Blumenbach believed this to be the original race from which the others were derived and he gave it the epithet of Caucasian because he believed, probably erroneously, that its most typical form — which was also that of man in his highest physical perfection — was to be met with among the mountaineers of Caucasus. The Caucasian race comprises the most highly civilized nations of the world, including most of the inhabitants of Europe (the Turks, Hungarians and Finns being excluded); the Hindus, Persians, Arabs, Hebrews and the ancient Phœnicians of Asia; and a large proportion of the inhabitants of northern Africa. See ETHNOLOGY.

CAUCASUS MOUNTAINS, a lofty and rugged range of mountains forming one of the natural barriers between Europe and Asia. It extends in a northwest and southeast direction from near the strait of Kerch on the Black Sea to near Baku on the Aspheron Peninsula projecting into the Caspian Sea. The distance between these points in a straight line is 700 miles, but following the main ridge of the mountains about 940 miles. The range varies in width from 60 to 130 miles and may be divided into three parts. The western portion, extending from the Strait of Kerch and the Sea of Azov to the peak of Elbruz, consists of a series of parallel ridges of stratified rocks, the ridges apparently formed by huge, tilted fault blocks. The northern slopes of the northern ridges rise rather gently out of the plain of Caucasia; the southern slopes, along the fault planes, are abrupt; and the southern slope of the main ridge has in places almost vertical walls 2,000 to 3,000 feet high. There are few passes through this great barrier, and these are difficult. The snow line is at about 9,000 feet.

The highest peaks of the Caucasus are in the central part, from Elbruz to the Adai-Khokh. Here, as to the westward, is a series of parallel ridges, the higher summits all snow-clad, with deep longitudinal valleys; but some of the highest peaks, Elbruz and Kazbek, are on spurs more or less isolated from the main range. In this central portion of the Caucasus, as yet but incompletely mapped, there are said to be fully 20 summits higher than Mont Blanc, the highest peaks being Elbruz, 18,470 feet; Dykhtau, 17,054 feet; Koshtantau, 16,881 feet; Janghitau, 16,564 feet; and Kazbek, 16,546 feet. The snow line is at about 11,500 feet, and the total number of glaciers of the first class is fully 175, while rounded rock surfaces and boulders in the valleys show that glaciation was much more extensive at no very distant time. East of Kazbek the range narrows and is narrowest south of Vladikarkaz, where it is crossed by the Russian military road to Georgia. This road runs over the Kobi Pass and through the great Davial Gorge, one of the greatest mountain chasms in the world. The eastern part of the Caucasus, from Kazbek to the Caspian, is of much more complicated structure; the range widening and including a high plateau crossed by subordinate ranges having an east-northeast and west-southwest direction, though what may be termed the main axis continues its southeast course.

The plains of Caucasia north of the mountains are underlaid by Tertiary and Quaternary strata. The foothills of the western Caucasus and the plateau of the eastern Caucasus show rocks of Cretaceous and Jurassic Age, and nearer the main axis of the range are Palæozoic formations. The main axis shows schists and gneisses with granite and syenite. Trachyte and similar rocks occur, and some of the peaks, Kazbek, are probably in part of volcanic origin.

The scenery of the Caucasus is wild and gloomy rather than beautiful. The lower slopes are thickly wooded, but there is not the combination of dark forests, beautiful lakes and graceful snow-crowned summits that makes some ranges — for instance the Selkirks in British Columbia — so attractive to the mountain-climber.

The mineral wealth of the Caucasus is very great; in fact, in this respect the range is one of the most noteworthy in the world, but owing in part to the very rugged topography much of this wealth is still undeveloped. Among the valuable resources may be named the coal fields near Ochemchiri and at Kuban and Kutais, the copper mines of Tiflis and Elizabethpol and the silver ores of Terek and Kutais. More important are the manganese mines near Kutais, whence some 500,000 tons of ore are exported

annually to various European countries and the United States. Most important of all are the oil wells of the Aspheron Peninsula, the most remarkable in the world, whence some $12,000,000 worth of petroleum, benzine, etc., are shipped to foreign countries every year. Consult Bodenstedt, 'The People of the Caucasus'; Deniker, 'Races of Man'; Keane, 'Man, Past and Present'; Ripley, 'Races of Europe.'

CAUCHY, kō'shē', **Augustin Louis**, French mathematician: b. Paris, 21 Aug. 1789; d. Sceaux, 23 May 1857. Entering the polytechnic school in 1805, he distinguished himself by the solution of difficult problems. In 1816 he won the grand prix of the Institute by his paper on 'Wave-propagation.' He qualified as a civil engineer, but selected science for his chief work, owing to health conditions. His political bias barred him from the higher college positions which were his due. He was created a baron by Charles X and in 1848 he became professor of mathematical astronomy until his death, at the Sorbonne. His politico-religious writings attest both his faith in the legitimacy of kingship and in the Catholic religion, one of his characteristic works in this line being the poem 'Charles V en Espagne' (1834). He contributed to almost every branch of mathematics which he perfected by his discoveries, notably residual and imaginary calculus. Among his numerous works are 'Cours d'analyse' (Paris 1821); 'Leçons sur les applications du calcul infinitesimal à la géometrie' (2 vols., 1826–28); 'Exercices mathematiques' (1826–29); 'Sur l'application du calcul de résidus' (1827); 'Leçons sur le calcul differentiel' (1829); 'Mémoire sur la dispersion de la lumière' (1839); 'Exercices d'analyse et de physique mathématique' (3 vols., 1839). The Academy of Sciences published 'Les œuvres complètes d'Augustin Cauchy' (27 vols., Paris 1882–1901). Consult Terquem, 'Analyse des travaux de Cauchy' (Paris 1857); Valson, C. A., 'Le Baron Augustin Cauchy: sa vie et ses travaux' (Paris 1868).

CAUCUS (short for "caucus club"), a political party gathering for nominations or conference on party policy, as distinguished from a merely hortatory one. It may be a town or ward meeting, to nominate local candidates or delegates to higher nominating conventions (the latter sort are also called "primaries"); or a party conference of members of Congress or a legislature, to decide on members or confirmations to office. Originally, a secret gathering on the model of the Caucus Club of Boston, whose leading business was the making of "slates" for local offices, it incidentally came to be the molding of a policy of local autonomy in opposition to British influence. The etymology of the name is pure guesswork. The usual derivation from "caulkers" (sc. club), or an imaginary "caulk-house," is most improbable. More plausible would be that from Lat. *caucus*, Gr. *kaukos*, a cup, as originally a convivial society, most secret societies of that day having classical names or initials; the words, however, are not classical, but mediæval, and so are less likely to have come under their notice. Possibly, though not probably, it is mere alliterative comic jargon. Most probable of all is the adoption of an Algonkin word, *kaw-kaw-wus*, to consult: —if the word is real: cf. "pow-wow." At all events, the club and the elements of the system originated in Boston during the 18th century. Samuel Adams' father was accredited as a founder and eminent master of the art, in which his son became immortal, and to which he owed his first election to the legislature. The preparation and distribution of ballots before the election was one of its chief instrumentalities. The first mention of the original club is in John Adams' diary, February 1763: he says the town officers are "regularly chosen there before they are chosen in the town," and intimates that the distribution of business favors as a *quid pro quo* was not absent, which might be assumed.

The system rapidly grew; indeed, in some form it is part of the inevitable machinery of majority rule, which in constitutional countries has supplanted the primitive decision of battle by merely counting the opposing hosts, it being assumed as a basis that the larger could outfight the smaller. But for common action of that majority there must be some method of determining its will before the elections, as to both measures and men; and all countries with any measure of popular control have some shaping and testing mechanism of the sort. In England it has been formally established since 1880, by the so-called "Birmingham system"; but in the higher lines of policy, even before that, the two great political clubs of London, the Carlton and the Reform, Conservative and Liberal, discharged many of the functions of informal caucuses. Nevertheless, the power of the caucus is greatly affected by local and national circumstances. In England and most Continental countries, it is restrained by the still powerful aristocratic system, which forms a counterpoise and provides natural leaders; in France, by the centralized government system. In no other country has it the same authoritative power as in the United States. Early in our history it became universal. Said Adams in 1814: "We have Congressional caucuses, State caucuses, county caucuses, city caucuses, district caucuses, town caucuses, parish caucuses, and Sunday-school caucuses at the church doors." This is primarily due to the entire legal equality of all classes; that absence of prescriptive privileges furnishing a shelter for minorities and independent action, which is considered the chief glory or the chief danger of democracy, according to the point of view. The gradations of the American political system into national, State, district and municipal powers have produced a corresponding hierarchy of caucuses, each sending delegates to the next higher caucus or convention, and constituting a "machine" of great efficiency and formidableness.

But it has been made at once practically irresistible, and largely worthless for its ostensible purpose of determining the general sentiment of the party, by the "spoils system," which throws the organization and management of the caucuses into the hands of those who can give their whole time to political work, because paid for this service (in reality though not in name) out of the public treasury. Thus managed, the caucus in the larger places does not necessarily represent the views of the majority, and very often the leading object is to prevent the majority from meddling with the machine. In theory, the caucus being a voluntary association of the members of a voluntary association, to

deliberate as to its policy and agents, all are fairly bound by its decisions, and have no right to "bolt" afterward; otherwise there is an end of all common action. It is of course to the interest of the managers to cultivate this theory, and the military similes of "campaigns" and "forces" and "deserters" and "closing up ranks," etc., and to stigmatize all individual courses as equivalent to treachery and insubordination; and no matter how spurious this technical majority may be, or by what methods a real minority may have attained a seeming vote of confidence, a "regular" nomination will always have enormous weight. In part, it is true, this is because the vast majority have no common wish or purpose, and are destitute of constructive political ideas; and any pronouncement of the constituted party authorities is really their will, which is simply to obtain such a mandate. Hence, "regularity" is the test of merit; and this willingness to accord to the show what belongs to the substance is the almost invincible bulwark of political corruption.

This has generated in the last few years a host of efforts, public and private, to break down the monopoly of the caucus and substitute a real and direct control of nominations by the party; control of policy cannot thus be shifted, but corruption is the work of men, not of measures. It cannot be said that any of these movements as yet are very successful or promising, largely owing to the consideration just mentioned, that the initial possession of political ideas is a condition precedent to expressing them. One scheme is to have nominations made by direct popular vote instead of by primaries; but this simply shifts the function of the caucus one stage back, to decide on the votes for nomination instead of the votes for offices. More elaborate, and in some directions more efficient, are the legislative provisions made in several States for taking the primary caucuses themselves under the control of the law, as elections have always been. In this case, all persons who wish to vote in a party caucus must register themselves as members of that party. The effects of this measure have been a singular mixture of good and evil, and probably reflect in this regard the motives of the enactment. On one hand, faction leaders can no longer swamp a caucus with a rabble of purchased voters from the lowest element of the other party. In theory a check list was always used; but as it had no legal validity, it was scouted whenever a majority, real or spurious, was interested in evading it. The check list under the law cannot be so treated. On the other hand, an obvious effect of the law, probably not absent from the minds of the framers, is to extinguish as a party force the independent or "mugwump" element of both parties, who try to reform their own party by a leverage obtained from the other; and are therefore excluded from either, as they cannot keep changing registration. If this was a motive, the Nemesis has been speedy. The party managers in various places are greatly disappointed and alarmed to find that only a fraction even of their normal and calculable voting strength will register at all, and therefore they are nominating in the dark, without knowing what the party sentiment is. When they honestly wish to ascertain the party feeling they have great difficulty in doing it. The dislike to sporting a registered, public and unchangeable party label is not confined to the more intellectual independents, but is strong in the general mass; and the attendance at primaries is a much less sure guide than of old to what the party will support at the polls. The precise future of the caucus cannot be forecast; but there is little evidence thus far of a loosening of its hold.

Congressional Caucuses for President and Vice-President.— These grew out of the Electoral system (see ELECTORAL COLLEGE), and perished, significantly, at the same time that the old theories of an educated official class and professional trained office-holders gave place to the inrush of the untrained democracy and rotation in office. It is no mere coincidence that the last Congressional caucus was held to nominate a candidate in the last election that returned a President of the old school. The masses were taking everything into their own hands; Jackson and popular nominations came in together, though there was one intermediate link when the people acted through the State legislatures. The theory of the electoral system was that the electors, themselves the chosen sages of the people, should make free choice of the best men in the country for the chief executive offices; but from the first their choice was pointed out in advance. While Washington lived and would take office, no other candidate for President was possible; and for his first Vice-President, John Adams was the choice of New England, and the other States had either their "favorite sons" or no special wish. In 1792 the same circumstances controlled; though New York's favorite, George Clinton, won the support of several southern States. The electors deferred to the notorious public feeling; but their action was nominally independent. In 1796 this was still true of the Federalists, who made a combination of North and South on Adams and Pinckney; it was substantially true of the Republicans, for Jefferson was the undisputed leader, and while the Republican members of Congress informally agreed to support Burr, there was no set ticket for the electors to support at party peril. But in 1800 both parties held regular but secret caucuses and adopted tickets which the electors voted solidly and even stupidly, with results still memorable. The Federalists voted that Adams and Pinckney should be supported alike. The point of this was that up to that date, there was no distinct candidate for President and Vice-President, the one who received the largest electoral vote being President and the next one Vice-President. Adams was certain to receive no Republican votes, but if all the Northern Federalists voted for Pinckney, he as a popular Southerner would probably receive some stray votes from that section, and so be elected President over Adams, whom the Federalists hated but did not wish to bolt. Thus they would defeat him by appearing to keep strict party faith. The Republicans on their part held a caucus, and made a similar agreement with regard to Jefferson and Burr; not with similar designs, but to placate New York, which complained that her candidates were "knifed" in the South. Of course in both cases, if the whole electoral body voted "straight," there would be a tie and no election.

This actually happened in the case of Jefferson and Burr, and the struggle was only settled after 36 votes. The results were the adoption of the 12th amendment to the constitution, regulating presidential elections and compelling electors to state which candidate was to have which office; the implacable hostility of Jefferson to Burr, which killed the chance of the latter to rise further in his party, drove him into the arms of Federalists and ultimately ended in the murder of Hamilton; and as the presidential electors had simply voted the tickets dictated by the party representation in Congress, they instantly became, as they have ever since remained, nullities. The second occasion was on 29 Feb. 1804, when the Republicans (in open, not secret caucus) renominated Jefferson; they dropped Burr for George Clinton (New York still keeping the place), by 67 votes to 20 for Hugh H. Breckinridge of Pennsylvania, and some scattering. The Federalists held no ostensible caucus; but as they were scheming to support Burr for governor of New York, and with that prestige nominate him for President, the plan must obviously have been agreed on in what served the purpose of caucuses. Burr's killing of Hamilton spoiled this scheme, however; they nominated Pinckney and King, and were almost annihilated. The third caucus was on 23 Jan. 1808, also by the Republicans; but only two-thirds of the party members attended, as the conclusion was foregone. Madison and Clinton were nominated. Meantime the Virginia legislature had split into Madison and Clinton factions, the former much the stronger; nominated separate sets of electors and carried the quarrel into Congress, where Monroe's party issued a manifesto protesting against both Madison and Congressional caucuses. The Federalists held none, and renominated their previous candidates. On 18 May 1812 the Republican or Democratic party held its fourth caucus, and renominated Madison on his express agreement to declare war against Great Britain; also nominating Elbridge Gerry for Vice-President. This time they appointed a national committee to see that the nomination was respected. The New York Democrats, however, were very restive under the "Virginia dynasty" and the "secretary of state dynasty"; and their members of the legislature held a caucus, nominated George Clinton and protested against the Congressional caucus as always nominating a Virginia candidate. A secret caucus or convention of Federalists was held in New York in Septembers, adopted the Clinton nomination and nominated Jared Ingersoll for Vice-President. On 29 March 1816 the Democrats, now practically the only existent party, held the last caucus which accomplished anything. Henry Clay and another member introduced resolutions that the caucus nominations be abolished, but were voted down; and Monroe was nominated, by no great margin, over William H. Crawford of Georgia. Daniel D. Tompkins of New York was nominated for Vice-President. In 1820 a caucus was summoned, but only about 50 members responded, and they took no action. The general feeling was now strong against the system, as there was but one party, and a nomination by Congressional caucus was equivalent to allowing Congress to appoint the President and Vice-President. In 1824 several State legislatures passed resolutions forbidding the State representation in Congress to attend a caucus if one were called. But the Crawford party, who wished to give his nomination the prestige of a national verdict, held one at which about a fourth of the members attended, and nominated him and Albert Gallatin. It can hardly have gained him much support, however, and a paralytic stroke finished whatever chance he might have had. In the next (1828) campaign, the State legislatures made the nominations; and in 1832 the nominating convention was introduced.

In recent years an adaptation of the Senate caucus, known as Aldrichism, was revived in 1910, to replace Cannonism which had become of ill repute among the voters, and had been partly overthrown in the 61st session of Congress. The essence of Cannonism had been the control of the House by the speaker, through his power of appointment of committees and his domination of the rules committee, backed by the power of the majority caucus. The essence of the new system adopted by the Democrats for the 62d, 63d and 64th Congresses was direct control of legislative action by the caucus itself. As at present constituted, the Democratic caucus is composed of all members of the majority party in the House. For the election of caucus officers and for the nomination of candidates for House officers, a majority of those voting binds the entire caucus. In deciding upon action in the House involving party policy or principle, a two-thirds vote of those present and voting at a caucus meeting binds all members of the caucus; provided, the said two-thirds vote is a majority of the full Democratic membership of the House, and provided further, that no member shall be bound upon questions involving a construction of the constitution of the United States or upon which he made contrary pledges to his constituents prior to his election or received contrary instructions by resolutions or platform from his nominating authority. If a member decides not to be bound by the caucus on any question, he must notify the caucus in advance. See UNITED STATES — BEGINNINGS OF PARTY ORGANIZATION.

Consult Haines, W. H., 'The Congressional Caucus of To-Day' (Baltimore 1915); Larned, J. N., 'The Caucus System; Its Failure and the Remedy' (Buffalo 1881); Lawton, G. W., 'The American Caucus System' (New York 1885); Trumbull, B., 'The Mischiefs of Legislative Caucuses' (Hartford 1819); Whitridge, F. W., 'Caucus System' (New York 1883); Ostrogorski, M., 'The Rise and Fall of the Nominating Caucus, Legislative and Congressional' (New York 1900); Halstead, M., 'Caucuses of 1860' (Columbus 1860).

CAUDA-GALLI GRIT, or **ESOPUS SHALE**, one of the basement members of the Devonian System in New York and New Jersey. The name ("cock's tail") is from a characteristic fossil, supposed to be a seaweed.

CAUDEX, in botany, the stem of a tree, more especially the scaly trunk of palms and tree-ferns bearing the scars of leaves. It often appears as a rhizome running along the sur-

face of the earth or underground, as in *Lycopodium.*

CAUDINE FORKS, a pass of southern Italy, in the form of two lofty fork-shaped defiles, in the Apennines (now called the valley of Arpaia), into which a Roman army was enticed by the Samnites, 321 B.C., and being hemmed in was forced to surrender.

CAUDLE'S CURTAIN LECTURES, Mrs., a series of humorous sketches, by Douglas Jerrold (q.v.).

CAUER, kow'ĕr, **Emil,** German sculptor: b. Dresden, 29 Nov. 1800; d. Kreuznach, 4 Aug. 1867. He studied at Berlin under Rauch and at Munich under Haller; in 1825 he went to Bonn where he was instructor in art at the university; in 1832 he was appointed drawing master at the gymnasium at Kreuznach. His fame rests on his invention of the so-called "Cauersche Masse," a superior substitute for plaster. Among his best works are 'Sickingen'; 'Charles V'; 'Melanchthon'; and the representations of Red Ridinghood and other fairy tale characters. He also restored the antiques in the museum at Dresden.

CAUER, Karl, German sculptor: b. Bonn, 14 Feb. 1828; d. Kreuznach, 17 April 1885. He studied with his father, Emil Cauer (q.v.), and with Wolff in Berlin; he also visited London several times in order to study the Parthenon friezes. Among his works are the Schiller monument at Mannheim, 'The Witch' and a number of portrait busts. In his later life he became interested in the question of coloring sculptures, and made a number of experiments in that line. He also designed the tomb of President Garfield at Cleveland.

CAUER, Robert, a younger brother of Karl Cauer (q.v.): b. Dresden 1831; d. 1893. He studied at Düsseldorf, and then with his father at Kreuznach and then at Rome. He made hundreds of little statuettes, charming in execution, the motifs of which are taken from romantic or classic tales and poems, such as 'The Sleeping Beauty,' 'Hermann and Dorothea,' 'Puss in Boots,' 'Paul and Virginia.' He and his brother Karl were commissioned by the Prussian Ministry of Public Instruction to superintend the reproduction in plaster casts of the principal structures of Italy. EMIL THE YOUNGER, HUGO, LUDWIG and ROBERT THE YOUNGER, sons of Karl Cauer, and STANISLAS, son of ROBERT THE ELDER are all sculptors.

CAUGHNAWÁGA, kô-nä-wä'gą, Canada, town in the province of Quebec, situated on the Saint Lawrence River at the head of the Lachine Rapids, 10 miles west of Montreal. It is an Indian town and was established by the Jesuit missionaries in 1676 as a colony for the Indians who were converted to Christianity. The converts were Iroquois, mostly Mohawks, and remained loyal to the French during their quarrels with other Indians and the English. In the Lower Canada insurrection of 1838 Caughnawága was the first place to be attacked by the rebels, who were repulsed by the Indians and a number of them taken prisoner. There were 2,240 Indians in the reservation in 1911.

CAUL, a membrane enclosing the viscera, such as the peritoneum or part of it, or the pericardium; also the amnotic membrane that surrounds all fœtal structures and sometimes becomes caught by the head of a child at birth. Many superstitions have been connected in the past with cauls. The child that happened to be born with one was esteemed particularly fortunate; and the possession of it afterward, however obtained, was highly prized, as of a charm of great virtue. The superstition is thought to have come from the East. With the French, *être né coiffé* was an ancient proverb, indicative of the good fortune of the individual. The alchemists ascribed magical virtues to it; and, according to Grose, the health of the person born with it could, in after life, be judged of by its condition, whether dry and crisp, or relaxed and flaccid. Medicinal virtues were imputed to it by the ignorant, as well as the property of preserving the owner of it from drowning. It has been bought and sold occasionally at a high price, sailors having been known to give as much as $150 for a single caul. Consult Brand, 'Popular Antiquities' (London 1870); 'Notes and Queries' (Vol. VII, London 1849 et seq.); Jones, 'Credulities, Past and Present' (London 1898).

CAULAINCOURT, kō-lăń-koor, **Armand** (ăr-măń) **Augustin Louis de,** DUKE OF VICENZA, French statesman: b. Caulaincourt (Aisne), 9 Dec. 1772; d. Paris, 19 Feb. 1827. He early distinguished himself as an officer, was made a general of division in 1805 and shortly after created Duke of Vicenza. In 1807 he received the appointment of Ambassador to Saint Petersburg. There he tried to maintain the alliance of Tilsit, and was successful until, in 1811, hostilities broke out between France and Russia, and he resigned his post. Faithful to the last to Napoleon, he was made Minister for Foreign Affairs in 1813, and during the Hundred Days resumed the office, receiving a peerage of France, of which he was deprived after the Restoration. He was then among those proscribed but his name was erased from the list on the intervention of the Russian emperor.

CAULIFLOWER, a member (*Brassica oleracea* var. *botrytis*) of the cabbage tribe, derived from the same original species as cabbage (q.v.), from which it differs in having a more or less compact head of metamorphosed flowers and adjacent parts instead of a bud-like head of densely packed leaves. Broccoli is a late hardy form of cauliflower not widely grown in America. Cauliflower is more delicately flavored than cabbage, like which it may be cultivated and prepared for the table. In its cultivation, however, it seems to be more difficult to bring to perfection unless conditions, especially moisture and temperature, are just right. The essentials of its cultivation are highly fertile soil well drained, but well supplied with moisture, a moist climate or season, and shelter from the direct rays of the sun, as on a northern slope, or reduction of the intensity of the sun's heat by planting either very early so as to mature in spring, or late so as to mature after mid-autumn. The heads produced in mid-summer are generally inferior in both size and quality. When the heads begin to develop, the leaves are tied above them so as to keep out foreign materials, but mainly to make the heads whiter and more attractive

to the purchaser. In preparing for the table the finer heads are usually served with a cream sauce; the poorer ones being pickled. In comparison with cabbage seed, the seed of cauliflower is very expensive because of the difficulty of maintaining its high quality. Formerly the seed was imported from Denmark and Germany, but Washington and British Columbia have been gaining in the market with their cauliflower, cabbage and other related seeds.

Cauliflower suffers from the same enemies that attack cabbage. Consult Bailey, L. H., 'Standard Cyclopedia of American Horticulture' (New York 1914); Allen, 'Cabbages, Cauliflower, etc.'

CAULKING, CALKING, or CAUKING, the act of rendering the seams of a ship watertight by driving oakum, cotton or the like, between the planks in the ship's decks or sides, in order to prevent the entrance of water. After the oakum is driven hard into the seams it is covered with hot melted pitch, to keep the water from rotting it.

CAULOPTERIS, a genus of fossil tree-ferns found in the coal-measures. The outer surface is characterized by four or more longitudinal rows of oval or roundish impressions or foliar scars. Each scar contains a linear cicatrix concentrically disposed either in horseshoe form, with the ends curved inward, or a complete ellipse, the upper portion of which surrounds a transverse trace somewhat like an inverted U. The inner scars mark the exit of the vascular bands of the petioles. Caulopteris is distantly related to the Marathaceæ. It is characteristic of the Carboniferous.

CAURA, kow'ra, a river of Venezuela, tributary to the Orinoco which rises in the southern part of Venezuela on the northern slopes of the Sierra Pacaraima, and flows north-northwest through the department of Bolivar. It is over 400 miles long. On both sides stretches the territory of Caura (22,485 square miles), with immense forests of valuable woods.

CAUS, kō, or CAULX, Salomon de, French engineer: b. Dieppe 1576; d. Paris, 6 June 1626. He was in the service of the Prince of Wales in 1612, and of the Elector Palatine, at Heidelberg, 1614–20, but by 1623 returned to France, and became engineer and architect to the King. At Frankfort, in 1615, appeared his 'Causes of Kinetic Energy,' a work in which is described an apparatus for forcing up water by a steam fountain, differing only in one detail from that of Della Porta. There is no reason to suppose that the apparatus ever was constructed, but on the strength of the description, Arago has claimed for De Caus the invention of the steam-engine.

CAUSE, that which brings about any change in the state, condition, circumstances, etc., of things; that which produces an effect.

In philosophy, that by which something known as the effect is produced and without which it could not have existed. To give a satisfactory notion of all the senses in which this word has been used it would be necessary to review all the teachings of metaphysics from the time of Aristotle downward. The various positions of the conflicting philosophers can here be only very briefly indicated. Aristotle states causes to be of four kinds: efficient, formal, material and final. The efficient is the force or agency by which a result or effect is produced; the formal the means or instrument by which it is produced; the material, the substance from which it is produced; the final, the purpose or end for which it is produced. A scientific cause demands the recognition of all the essential conditions, any one of which being absent the effect could not take place. Locke finds the origin of the notion of cause in sensation. Assuming that bodies have the property of modifying each other, it is only necessary to observe them to perceive and be driven to admit the principle of causality. Hume declares the power which we attribute to one object over another to be a chimera; such a power does not exist, or if it does we can have no idea of it. What we call cause and effect is merely two phenomena always following in the same order and which we have fallen into the habit of associating in our minds in such a way that on perceiving the first we inevitably expect the second. According to Leibnitz there is no existence, however humble, but is a force, that is, a real cause. The notion of force is the base even of the notion of existence; all that which *is* has a certain virtuality, a certain causative power. The human soul, like all the other limited forces in this world, is but a monad isolated in itself, but yet in whose inner being the whole creation is reflected, and whose movements have been from the beginning co-ordained by Divine Wisdom with the harmonious movement of the universe. Kant's doctrine is that the notion of cause and the principle of causality certainly exist in our minds; but they are only simple forms of our understanding, or the entirely subjective, albeit inevitable, conditions of thought. We are compelled by a law or a form pre-existing in our intellect to dispose all the objects our imagination represents, or all the phenomena our experience can discover, according to the relation of cause and effect; but we do not know if anything really exists, independent from our intellect, which resembles a cause, a force or effective power. Against the doctrines of the intuitionalists it has been urged that the mere statement that the mind possesses a belief in causation proves nothing; some men believe in it, others do not, and unanimity is necessary to the establishment of a universal belief. Nay, more, the mere universality of a belief is no conclusive proof of its correctness, as put in the words of the late John Stuart Mill — "A mere disposition to believe, even if supposed instinctive, is no guarantee for the truth of the thing believed. If, indeed, the belief amounted to an irresistible necessity, there would be no use in appealing from it, because there would be no possibility of altering it. But even then the truth of the belief would not follow: it would only follow that mankind were under a permanent necessity of believing what might possibly not be true; just as they were under a temporary necessity,— quite as irresistible while it lasted — of believing that the heavens moved and the earth stood still. The things which it has been supposed that nobody could help believing are innumerable, but no two generations would give the same catalogue of them." The theological question of a First Cause is debated on the ground that matter of itself is inert, that spirit is active, that in order of existence one spirit or active force must be

the first and uncaused cause. This is based on the common fallacy which demands a first term for every series, even though series without first terms are common and consistent.

The notion of cause used to be counted among the primary concepts of natural science, but there is a notable tendency nowadays to cut loose from a causal term, and to render the function of science one of description rather than one of causal explanation. This is not merely a desideratum or a program, but represents the attitude really taken by modern scientists in their work. A causal explanation of an occurrence X consists in a statement of certain events, A, B, C, etc., which, if present, will always evoke X as a temporal consequent. This causal explanation of X, then, involves the statement of a law according to which X occurs, but not every descriptive law lends itself to expression in causal terms. In the first place, a causal law in the strict sense involves a definite, irreversible, temporal order between the events it connects; in the second place, the antecedents, A, B, etc., are definite events, which either are there or are not there. Now, the laws which have been most fruitful in the expression of scientific data and the stimulation of scientific research have usually been quantitative correlations, in which the correlated terms have not necessarily stood in a unidirectional temporal relation to one another, or indeed in any temporal relation whatever. The law of gravitation says that the acceleration of a body of mass m with respect to a body of mass m' at a distance d from it, if the bodies start from rest and are acted on by no external forces, will vary as $\frac{m'}{d^2}$. Here the acceleration, m', and d are all contemporaneous, and are all more-or-less facts, not yes-or-no facts. As far as the physicist is concerned, it is utterly meaningless to say that the cause of the attraction resides in the mass m, or the mass m', or in anything else whatever. In spite of these facts, the unfortunate tradition which finds its typical exponent in Mill still makes many a metaphysician lapse into causal language in his treatment of natural science.

In law, a cause is a right of suit or action; it is something for which suit may be brought by someone against another; it includes the right of action. In practice, a cause of action comes into existence when there is such a state of facts or circumstances as will enable a person or party having certain relations with particular persons or property to commence a suit.

CAUSE CÉLÈBRE, kōz sā'lābr', from the French signifying 'celebrated case,' a term generally applied to any criminal or civil case of special legal importance or interest, national or international. Of such are celebrated trials for political crimes, for treason, of judicial errors, of impostors, poisoners, assassins, murderers, etc. Among *causes célèbres* of modern days may be cited the Dreyfus case 1896–1903, the Steinheil 1912, the Caillaux 1914, in Paris; the Sickles-Key case 1859–60, the Stokes-Fiske case 1872, the Thaw 1906–14, the Becker-Rosenthal 1912–14, in New York; the Bielis-Mendel ritual murder case in Russia 1912–13, and in England the Tichborne case 1871, when an impostor laid claim to an ancient title and rich estates. A French ritual murder case in which Voltaire championed the cause of the victim was that of Calas broken on the wheel in 1762. The biliography of French *causes célèbres* is voluminous. Consult Gayot de Pitaval, 'Causes célèbres et intéressantes' (3d ed., 22 vols., Amsterdam 1772–88).

CAUSERIES DU LUNDI, or **MONDAY-CHATS**, was the title given by Sainte-Beuve to the articles which he contributed every Monday for nearly 20 years, beginning with 1849, to the daily newspapers *Le Constitutionnel* and (after 1852) *Le Moniteur*. Their 15 volumes, together with the three volumes of the 'Premiers Lundis' and the 13 volumes of the 'Nouveaux Lundis,' which are not to be separated from them, form an unmatched series of critical studies, of which literature is the central but by no means exclusive interest, and present a gallery of portraits in which poets and philosophers, statesmen and savants, artists and actresses, great wits and charming and beautiful women, are painted with a wonderfully animating and revealing touch. The range and variety of the subject matter are surprising. Few figures of significance in French life and letters of the last three centuries fail to find a place in the collection. Nor was Sainte-Beuve's view confined to his own country. He was widely read in foreign literatures, particularly English. His curiosity was insatiable and his mind singularly mobile and insinuating. For such a mind criticism had to be something quite different from what it had traditionally been,—a classifying and judging of literary compositions according to some definite, accepted canon of taste. Its task was primarily to understand a work and a person in the light of their intention rather than to measure them by some conventional standard. Literary works were viewed but as a partial expression of individualities, to be fully comprehended only when illumined by the light thrown upon them by complete knowledge of their author's life, times, family, friends, surroundings, circumstances and character. The preliminary reading that went to the making of each of these articles was prodigious. The critic could neglect nothing that could add to his knowledge of the man or woman whose work he was assessing. Sainte-Beuve did not, however, abandon standards of judgment and give himself up, like Taine, to explaining literature in terms of race, environment and moment. He maintained, with increasing insistence as he grew older, the tradition of a cultivated and disciplined taste. He furthermore added to his rare qualities of intelligence and discrimination the command of an entirely adequate style, of great delicacy, brilliancy and charm, so that the 'Causeries' delight us no less than they instruct. Taken all in all they constitute, with the companion series of 'Portraits,' as imposing a body of criticism as any literature can show, and justify the almost unanimous endorsement of Matthew Arnold's estimate of their author as "the finest critical spirit of our time." Of English translations of some of the *Causeries*, that by W. B. Matthews, 'Sainte-Beuve's Monday-Chats' (Chicago 1877), offers especially essays dealing with great French writers, while that of A. J. Butler, 'Select Essays of Sainte-Beuve' (London), confines

itself to those of interest to students of English letters.

ARTHUR G. CANFIELD,
Professor of Romance Languages, University of Michigan.

CAUSTIC, *in medicine,* any agent which causes a destruction of the parts by local application. Caustics act by withdrawing water from the skin, by coagulation of the albumen or by other chemical change. Thus caustic soda and caustic potash act by the abstraction of water. They further act on fats, saponifying them, and are particularly serviceable as caustics if penetration is desirable. Sulphuric acid acts in much the same way, but it is very difficult to control its caustic action. Others of the acids are used as caustics, nitric, glacial acetic, tri-chlor-acetic, etc. Many mineral salts, silver nitrate, zinc sulphate, zinc chloride, copper sulphate, arsenic, etc., are valuable caustics. The most reliable caustic is the actual cautery using a dull red flame. Caustics are used to stimulate the growth of granulating wounds, to remove warts, condylomata, etc., to cleanse ulcers, remove cancerous growths, to prevent poisoning by dog-bites, etc.

In mathematics, the curve to which rays of light are tangent after reflection from a surface or refraction by a lens. Opticians endeavor so to shape their mirrors and lenses as to make the caustic two intersecting straight lines. When this is achieved, the "spherical aberration" disappears. Caustic curves may often be seen on the bottom of a cup, produced by reflection from the curved wall of the cup. See also LIGHT.

CAUSTIC AND SODA, Electrolytic Production of. See ELECTROCHEMICAL INDUSTRIES.

CAUTERETS, kō-tē-rā, a watering-place of southwest France, in the department of Hautes-Pyrénées, 3,250 feet above sea-level, in the valley of the Laverdan, 42 miles south-southeast of Pau. The stationary population of the place is only about 1,550, but it is annually swelled in summer by some 50,000 visitors, for whose accommodation numerous sumptuous hotels and bathing establishments have been built. It is a good centre and guide-station for ascents among the Pyrenees. The sulphurous springs, 24 in number, and varying in temperature from 75° to 137° F., are the most abundant in the Pyrenees, and have been known from Roman times; though their modern reputation dates from the 16th century, when Margaret, sister of Francis I, held her literary court and wrote much of her 'Heptameron' at Cauterets.

CAUTERY. See CAUSTIC.

CAUTIN, kow'tēn, Chile, a province divided into the departments of Temuco and Imperial. It is bounded by the Pacific on the west, Argentine on the east, Malleca and Valdivia on the north and south, respectively. It has an area of 5,832 square miles, and a population of 161,000. The city of Temuco (pop. 11,000) is the capital. Principal towns are Nueva, Imperial, Lautaro and the port of Carahue. There is a regular line of steamers between Carahue and Valparaiso. In the province are numerous lakes, one of which, Villarica, with a surface of 100 square miles, lies at the base of a volcano of the same name. The Central Railway connects the capital with other cities of the republic. The soil of the province is fertile. Wheat, fruit and lumber are produced.

CAUTIN, a river in Chile; flows west through a province named after it, and empties into the Pacific Ocean. Its length is about 200 miles.

CAUTIONARY, a term used in Scotch law and signifying the "promise or contract of one, not for himself, but for another." A simple cautioner is one who binds himself conjointly with the debtor or principal for the greater security of the creditor. The creditor may proceed against the principal debtor and cautioner, or against either of them. The cautioner may, however, stipulate on the document constituting the cautionary obligation that the creditor shall take legal measures against the debtor or principal. Cautioners are frequently taken bound, conjointly and severally, or as full debtors, with the principal, in which case both parties are liable for the whole debt. It follows, from the nature of the obligation, that a cautioner who has paid the debt has an action against the principal for relief. All cautionary obligations must be in writing, and have the signature of the cautioner attached; the conditions of contract must be clearly stated, which must be strictly observed, otherwise the cautioner is freed.

CAUTIONARY TOWNS, four towns in Holland, Briel, Flushing, Rammakens and Walcheren, so named because they were given to Queen Elizabeth in 1585 as security for their repaying her for assistance in their struggle with Spain. They were restored to the Dutch Republic by James I in 1616, although only a portion of the sum advanced was refunded. Consult Cheyne, 'A History of England' (Vol. I, pp. 195, 212, 243).

CAUVERY, kô'vėr-ĭ, **CAVERY,** or **KÁVERI,** a river of Hindustan, to the waters of which Mysore and the Carnatic owe much of their agricultural wealth. It rises from several head streams in Coorg and Mysore, near the coast of Malabar, flows southeast through Mysore and the Madras Presidency, and after a winding course of about 470 miles falls into the Bay of Bengal by numerous mouths, the largest being the Coleroon. Where it separates Mysore from Coimbatore the Cavery forms an island called Sivasamudram, near which are two magnificent cataracts, each about 200 feet high, and more or less broken into cascades according to the volume of water. In connection with this river and its tributaries important canals and dams have been constructed for purposes of irrigation, with the effect of rendering the country on either side highly productive. The Cavery is filled by the monsoon rains in May and July, but is not navigable except by small boats. The irrigation system of its delta, dating from the 2d century, is the most ancient in India.

CAVA, kā'vā, DEI TIRRENI, Italy, city in the southern province of Salerno, situated in the valley of Fenestra, three miles northwest of Salerno. It is the seat of a bishop, suffragan to the Pope, and contains a cathedral, three other churches, a convent, a house of refuge, a hospital and a seminary. Silk, cotton and

linen are manufactured here, and in the numerous small villages that surround the town. The district is extremely unproductive, but the inhabitants have become wealthy by their industry and commerce. About one mile from Cava is the magnificent Benedictine convent of the Trinity founded, in 1025, by Saint Alferius over the cavern he had occupied, which formerly contained an excellent library, now transferred to Naples. This convent is now national property and contains a lyceum and boarding-school. It is a resort for Neapolitans in summer and for foreigners in spring and autumn. Pop. (1911) 23,817.

CAVAGNAL, Marquis de. See VAUDREUIL DE CAVAGNAL, PIERRE FRANÇOIS DE RIGAUD, MARQUIS DE.

CAVAIGNAC, kā-vă-nyăk', Eléonore-Louis Godefroy, French journalist and politician, son of Jean Baptiste Cavaignac (q.v.). He opposed Louis Philippe, and was one of the founders of the Société des Amis du Peuple and of the Société des Droits de l'Homme (1832), of which he was president in 1843. He took an active part in the various uprisings of the time, and in 1835 escaped to England. Returning to Paris in 1841, he became one of the editors of *La Réforme*, an opposition newspaper. An excellent statue by Rude is dedicated to him at Montmarte.

CAVAIGNAC, Jacques Marie Eugène Godefroy, French politician, son of Louis Eugène Cavaignac (q.v.): b. 22 May 1853; d. Saint Calais, department of the Sarthe, 25 Sept. 1905. He studied at the Lycée Charlemagne, Lycée Louis le Grand, École Polytechnique and École des Ponts et Chaussées, interrupting his studies long enough to serve in the Franco-Prussian War. In 1882 he was elected to the Chamber of Deputies, and in 1885 was appointed under-secretary of state. In the Panama revelations of 1892 he bore a conspicuous part. On the organization of the Bourgeois Cabinet, 30 Oct. 1895, he was appointed Minister of War. In August 1898, he added to the excitement over the Dreyfus prosecution by forcing Lieutenant-Colonel Henry to confess to a forgery of certain letters bearing on the Dreyfus case, and the accused officer committed suicide within a few hours. In the following month Cavaignac resigned his office. He was author of 'La formation de la Prusse contemporaine' (1897–98).

CAVAIGNAC, Jean Baptiste, French revolutionist: b. Gourdon 1762; d. Brussels, 24 March 1829. He became an advocate at the Parliament of Toulouse; and in the National Convention acted as deputy from the department of Lot. He rose to be one of the leaders of the Mountain (Extreme Republicans), and, on his various dictatorial missions to the armies of the Republic, displayed the greatest energy, tact and incorruptibility. He was a member of the Council of Five Hundred; and afterward became a councillor of state in Murat's kingdom of Naples. During the Hundred Days he acted as prefect of the Somme. He was banished as a regicide, at the second Restoration.

CAVAIGNAC, Louis Eugène, French general: b. Paris, 15 Oct. 1802; d. 28 Oct. 1857. His father, Jean Baptiste Cavaignac (q.v.), was a furious revolutionist, and member of the Council of Five Hundred. Young Cavaignac entered the École Polytechnique in 1820, and afterward the military school at Metz, and in 1824 joined the 2d regiment of engineers. He served in the campaign in the Morea, and in 1829 was appointed captain. Being at Arras on the outbreak of the revolution of 1830 he was the first officer in his regiment to declare for the new order of things. In 1832 he was sent to Africa, where he remained for several years, and greatly distinguished himself in defending the French settlement against the Arabs and by his judicious organization of military hospitals, barracks and works of defense. In 1844 he received the appointment of brigadier-general, with the government of the province of Oran in Algeria. Cavaignac was in Africa when the revolution of February 1848 took place. In March of that year he was created by the provisional government general of division and governor of Algeria. Shortly afterward the office of Minister of War was offered to him, but declined. On 23 April he was chosen representative of the department of Lot in the National Assembly, and proceeding to Paris to take his seat arrived there on 17 May. The capital was then in a state of great excitement from an attempt on the assembly by the Red Republicans two days before. Cavaignac was offered again the portfolio of the Minister of War, and this time accepted it. The measures which he adopted to guard against the crisis which was evidently approaching were prompt and decisive. In a few days an army of nearly 30,000 men was assembled in and around Paris, and this precaution was speedily justified by the events which followed. On 23 June, at 11 o'clock A.M., the terrible Communist insurrection burst forth, and for three days Paris presented the most dreadful scene of tumult and bloodshed which had been witnessed there since the massacre of Saint Bartholomew. About 15,000 persons perished, and property was destroyed to the value of upward of $1,000,000. By the energy of General Cavaignac, aided by the loyalty of the army and the national guard, the insurrection was suppressed on 26 June. On that day the National Assembly delegated the entire executive power to Cavaignac as dictator, who resigned it again into its hands on the 29th, and received it anew on the same day, with an acknowledgment by the legislative body of the services rendered by him to his country. Notwithstanding these he was defeated in the elections for the presidency in the month of December following, and Louis Napoleon was preferred to the office. On 20 December he resigned his dictatorship. After the *coup d'état* of 2 Dec. 1851, he was arrested and conveyed to the fortress of Ham, but was liberated after about a month's detention. In 1852 and in 1857 he was elected member for Paris of the legislative body, but on both occasions was incapacitated from taking his seat by refusing to take the oath of allegiance to the Emperor. The last years of his life were spent at his country-seat in the department of Sarthe. Consult Montfort, 'Biographie du général Cavaignac' (1848); Deschamps, 'Vie de Cavaignac' (1870).

CAVAILLÉ-COLL, kă'vī-yā'kōl', Aristide, French organ builder: b. Montpellier, 2

Feb. 1811; d. Paris, 13 Oct. 1899. He built the organs in the Parisian churches of Saint Sulpice, the Madeleine, etc., and invented the pressure method for sounding tones of different depths and heights. His writings include a 'Projet d'orgue monumental pour la basilique de Saint-Pierre de Rome' (1875). Consult Lefebvre, 'Le grand orgue de l'église Saint-Michel du Havre' (Havre 1888), an account of a work executed by Cavaillé-Coll in 1887-89.

CAVAILLON, kā-vā-yôn (ancient CABELLIO), France, a town of southeast France in the department of Vaucluse, 20 miles southeast of Avignon by rail. It is an ancient place, and has a cathedral dating from the 12th century. The surrounding district is one vast garden, producing excellent fruit, especially melons and peaches. A considerable trade is carried on in silk, olive-oil, fruit, early vegetables and wool. The industries comprise straw hats, edge-tools, tanning, the preserving of fruits and vegetables, etc. The Romans had an important colony here, and erected many edifices, of which almost the only remains are some tombs and the fragment of a triumphal arch. It was an episcopal city as early as the 5th century. Pop. 9,416.

CAVALCANTI, kā-väl-kän'tē, **Guido**, poet: b. probably in Florence about 1252; d. there, 28 or 29 Aug. 1300. He was the friend of Dante, in whose judgment he excelled all in lyric verse (Purg. xi, 97); and like him a zealous Ghibelline. When the dissensions of the Guelfs and Ghibellines disturbed the public peace of Florence the citizens banished the chiefs of both parties. The Ghibellines were exiled to Sarzana. On account of the unhealthful air of that place they were permitted to return; but Cavalcanti had contracted a disease of which he died at Florence. In his youth he made a pilgrimage to Saint Jago de Compostella in Galicia. Returning home through France he fell in love at Toulouse with a young lady by the name of Mandetta. To her most of his verses which we possess are addressed. They are remarkable, considering the period at which they were written, for their beautiful style. His 'Canzone d'Amor' have gained him the most fame. The learned Cardinal Egidio Colonna and some others have made commentaries on it. Various editions of his works have appeared, those of Arfione (Florence 1881); of Ercole (Leghorn 1885); of Rivalta (Bologna 1902), and of E. C. (Lanciono 1910). Translations have been made by Ezra Pound (Boston 1912); by Fletcher (in *Modern Philology* 1910). Consult Ercole, 'Guido Cavalcanti e le sue Rime' (1885); Fletcher, J. B., 'The Religion of Beauty in Women' (New York 1911).

CAVALCASELLE, kā-väl-kā-sĕl'lā, **Giovanni Battista**, Italian art historian: b. Legnano, 22 Jan. 1820; d. Rome, November 1897. He studied painting at the Academy of Venice and at Munich. He was active in the revolution of 1848 and was forced to escape to England. He became the literary associate of J. A. Crowe (q.v.), with whom he produced the epoch-making 'History of Painting in Italy' (1864–71), the most complete work on the subject; 'Early Flemish Painters' (1857–72); 'Life of Titian' (1877); 'Raphael' (1883). He was inspector of the National Museum in Florence and director-general of fine arts in Rome. A new edition of his 'History' appeared by Edward Hutton (3 vols., 1909). A revision was begun by Crowe and continued by S. A. Strong and Langdon Douglas (6 vols.).

CAVALIER, kā-väl-yā, **Jean**, French soldier, chief leader of the Camisards in the wars of the Cevennes: b. Ribaute, near Anduze, 1681; d. Chelsea, England, 17 May 1740. He was at Geneva when the severe measures of Louis XIV against the fanatical Camisards induced him to return home. Several insurrections had already broken out, but he soon so distinguished himself by his courage and success, that, though only at the age of 24, he became the acknowledged head of the insurgents. Notwithstanding their gallantry they were obliged to carry on the war on such unequal terms that the impossibility of success became apparent, and Cavalier entered into a capitulation with Marshal Villars, by which he obtained a pension of 1,200 livres, a colonel's commission and permission to raise a regiment of his own for the King's service. He was summoned, however, to Versailles, and, finding himself looked upon with suspicion, made his escape and soon after visited England. In the Spanish War, being supported by the English and Dutch, he commanded a regiment raised by himself and partly consisting of refugee Camisards, and distinguished himself greatly at the battle of Almanza in 1707, where he was severely wounded. He was afterward pensioned by the British government, appointed governor of Jersey and made a major-general.

CAVALIER, (1) a horse-soldier; an armed horseman; a knight; the name given to the supporters of King Charles I, during the great Civil War in England, from their gay dress and demeanor, as contrasted with the austerity of the Parliamentary party, who were styled Roundheads, from the mode in which the more puritanical of that body wore their hair closely cropped. (2) In fortifications, a kind of interior bastion, several feet more elevated than the principal bastion of the fortress in which it is formed. The use of the cavalier is two-fold: It serves either to defilade the works from the fire of an enemy or an adjacent height, or to command the trenches of the besiegers. Cavaliers are sometimes constructed in the gorges, or on the middle of the curtain, and their form is semi-circular; but when they are within the bastion they are now built with straight faces and flanks parallel to those of the work in which they are placed. French cavaliers are works raised by besiegers on the glacis of a fortress for the purpose of enabling them to direct a fire of musketry into the covered way.

CAVALIER POETS, a term properly applied to the group of lyrists among the followers of Charles I and of his exiled son, from the first actual warfare with the Commonwealth until the Restoration. The term is also applied more broadly to other poets of the time such as Herrick (q.v.) or Donne (q.v.) who wrote in the same style; but the distinction of the manner is due to those loyalists who were preeminently court gentlemen and fighters for the King.

In literary tradition the Cavalier poets took their descent from Wyatt and Surrey, Sidney

and Raleigh, and those other cultured and well-traveled 'makers' of the Tudor and Elizabethan courts, who naturalized the Provençal lyric and its love-system on English soil. This influence, of course, had been strong in Chaucer's time, but only with this later group did lyric poetry as an accomplishment become well established among the gentlemen around the English sovereign, and take on a native manner, truly expressive of the historical moment.

The early Elizabethan court poets, even in their narrowest imitations of the French sonneteers, had some of the largeness of the age in their manner; they spoke consciously to an audience. At the end of the reign the Renaissance wealth of scholarship and culture had spread through the nation, in a wide circle from the court. What remained the peculiar inheritance of the courtly poet was undergoing a refinement such as the novel shows in the second part of 'Euphues,' in which the story is taken into the drawing-room, where the feminine influence is dominant, imposing in a modern way the exquisiteness which is the end of all courts of love. By a similar transition the courtly poets, letting go the larger subjects and the public manner, made the quality of their verse the very qualities of graceful society — the personal compliment; the brief sallies that general conversation demands; the quick turns in which grace and wit count; that method of society verse which restrains beneath an even manner all feeling that is too personal or too deep. The presence of the ladies is felt — not of one woman alone; as in the garden scene in the second part of 'Euphues,' the lover must find ways to woo his lady under the very eyes of her teasing comrades.

This development of the court poetry was occasioned, no doubt, by the natural growth of culture and the perfecting of manners in English society, as well as at the court. Some impression, however, was made upon the court by the change from Elizabeth's manlike rule to the gentle influence of Charles' refined Queen. The influence of Henrietta Maria, however, was not altogether admirable. Refining though it was, it took the direction of effeminacy, and in the *precieuse* fashion which is fostered, of insincere pedantry. William Harbington (1605–54) in his 'Castara' (1634) illustrates the over-refinement of theme to which the graceful court verse at this moment might have seemed doomed.

The personality of Charles, however, which enlisted the loyalty of the courtiers, his tragic end, and the exile of his family and his followers, gave back to the courtly verse the vitality it was losing, and in addition some new characteristics, which distinguished it as Cavalier poetry. Loyalty to Charles and to his son, unlike loyalty to Elizabeth, was personal more than patriotic; it served to revive therefore some of the most ideal conditions of chivalry. Charles became not so much the sovereign of a country as the head of an order of knights; his exiled son became their leader under all skies. The sufferings that were the cost of their loyalty, their sense of a lost cause and the long tradition of proud breeding that would bear all with outward lightness, made the pathos and the grace of the best Cavalier poets. The Elizabethan largeness of manner never quite returned, though the Marquis of Montrose (1612–50) echoed it nobly in his lines on the death of Charles I, and in those on his own execution; but in general the lighter gracefulness continued to be a mark of the Cavaliers, as in Montrose's most famous lyric, 'My dear and only love.' In singleness and loftiness of devotion, in the actual sacrifice of his life for the cause, and in the natural, incidental place of literature in his career, Montrose is perhaps the ideal Cavalier poet.

Richard Lovelace (1618–58), author of the best known Cavalier lyric, 'Tell me not, sweet, I am unkind,' and of the only less perfect 'To Althea, From Prison,' illustrates in his life, as does Montrose, the tragedy that often underlay this graceful verse, but the tragedy is here one of sentiment. He impoverished himself to give his fortune to the King. On returning from the wars abroad, he was imprisoned, and his 'Lucasta,' Lucy Sacheverall, believing him dead, married some one else. Lovelace died, worn out by suffering and poverty.

A similarly typical fate was that of Sir John Suckling (1609?–42), who spent his fortune for the King, became an exile and died abroad. He wrote several plays, and the clever 'Session of the Poets,' the model of much later criticism in light verse; his fame, however, is founded on his Cavalier poems. In his life and in his writing he is neither so noble nor so pathetic as Montrose and Lovelace; he is a roisterer at heart, as can clearly be seen even in the exquisite 'Ballad upon a Wedding.' But he is master of the reckless tone that finally characterized the school, the tone that had been caught so finely by George Wither (1588–1667) — who strangely enough lived to be a Roundhead — in his 'Shall I, wasting in despair?' In such lines as 'Out upon it, I have loved three whole days together,' Suckling turns the bravado note into a pretty compliment; in his best lyric, the song from 'Aglaura'—"Why so pale and wan, fond lover?" he carries it to its logical conclusion of recklessness.

Among the numerous poets who wrote in the Cavalier manner, though not under strict Cavalier conditions, besides Herrick and Donne, already noticed, should be mentioned Edmund Waller, for his two perfect lyrics of compliment, 'On a Girdle,' and 'Go, lovely rose.' But far more important is Thomas Carew (1598?–1639?), probably the most gifted minor poet of the time, with the exception of Herrick. He came of good family, enjoyed an excellent education and, it seems, led a reckless life. In his verse the Cavalier compliment is most elaborate and most noble, as in the incomparable 'Ask me no more,' and in the epitaphs on Lady Mary Villers, where he is indeed more the scholar than the Cavalier. 'Give me more love or more disdain,' and 'He that loves a rosy cheek,' are other familiar examples of his felicity. He had in full measure the rhetorical grace of the true Cavalier, the secret of splendid openings and cadences — an unacademic art that began not in literary imitation but in courtly conversation, in the fine compliment paid to beauty that need not be abashed by praise.

JOHN ERSKINE,
Adjunct Professor of English, Columbia University.

CAVALIERE SERVENTE, kä-vä-lē-är'ē sĕr-vĕn'tā. See CICISBEO.

CAVALIERI, or **CAVALLERI, Francesco Bonaventura,** Italian mathematician: b. Milan 1598; d. Bologna, 3 Dec. 1647. He studied mathematics at Pisa under B. Castelli, a disciple of Galileo, officiated as professor in Bologna, and was author of several mathematical works, the most prominent of which was entitled 'Geometria Indivisibilium continuorum nova quadam ratione promota.' Having expressed in this work some original ideas concerning the abstruse sciences, the Italians claim him to be the inventor of the infinitesimal calculus (q.v.). It is indeed true that his method of indivisibles enabled him to attain certain results which we now reach by the integral calculus, but Cavalieri made the false step of regarding a plane figure as the sum of a finite number of narrow rectangular strips and a solid figure as the sum of a finite number of cylindrical laminæ, instead of considering the figures in question as *limits* of such sums.

CAVALLA. See KINGFISH.

CAVALLERIA RUSTICANA ("Rustic Chivalry"). The title of a famous short sketch of how an "affair of honor" was settled in a country place in Sicily, by Giovanni Verga. The story first appeared in 1880 in a collection of tales entitled 'Vita dei campi' ("Life in the Fields") and subsequently when the stories were reprinted gave its name to the collection. The direct way the story is told, without any elaboration, leaving to the imagination precisely what is necessary, makes the tragedy a model of this kind of realistic writing, a kind, which has given Verga a very high rank among modern Italian writers. Turiddu, a young soldier, returns from military duty to find that his sweetheart, Lola, during his absence has given her hand to a well-to-do villager, Alfio. To revenge himself Turiddu wins the affection of a young girl, Santa, living directly opposite Lola, and then endeavors to make the latter jealous. He succeeds, abandons Santa, wins back Lola and pays for his treachery with his life in a duel with Alfio. Such are the bare facts. The way they are presented in rapid succession leading up to the tragedy is realism of the highest order. Moreover, the local coloring is so strong as to give the sketch a flavor that is peculiarly Italian and which characterizes thoroughly everything that is presented in the tragedy: Turiddu's uniform and red cap with the tassel worn by the Bersaglieri that strangely agitate the young girls and attract the small boys; his reproach in Sicilian dialect to Lola, just before her marriage; the ostentation of the latter after her marriage, of her jewels and ornaments at the balcony of her house in order to proclaim her wealth; the courtship of Turiddu and Santa, broken by Lola's jealousy, and the resulting consequences, that is the challenge of Alfio to Turiddu; the binding of the promise to fight the duel by embracing and by Turiddu's biting Alfio's ear; the duel at sunrise in the Indian fig field, where Alfio, wounded, stoops down, picks up a handful of dust, throws it into his opponent's eyes, thus blinding Turiddu, making it possible for Alfio to wreak his revenge by dispatching the betrayer of his honor. In 1884 Verga dramatized 'Cavalleria rusticana' as a one-act play containing nine scenes. Several minor characters appear and Santa is called Santuzza. The whole action takes place Easter morning in the village *piazzetta,* where the wine shop of Turiddu's mother, Nunzia, is seen and the village church. Although Verga's dramatized version is effective, the drama is hardly the equal of the novella, the charm of which in no small degree lies in the merely suggested background. Undoubtedly much of the celebrity of 'Cavalleria rusticana' is due to Pietro Mascagni's opera of the same name, the libretto for which was written by Targioni-Tozzetti and Guido Menasci, shortly before 1890. Although the original version of the story is followed quite closely, several lyrics are introduced serving as texts for arias and choruses, which, admirable as they are in their way, by reason of their development, rather detract from the original dramatic effect. A readily available text of 'Cavalleria rusticana,' with English notes and commentary, by Professors Wilkins and Altrocchi of Chicago University, will be found in a collection: 'Italian Short Stories' (Boston 1912). An English translation by Alma Stretell appeared in England in 'Cavalleria Rusticana and Other Tales of Sicilian Life' (London 1893), and in this country by Nathan Haskell Dole, in a volume entitled 'Under the Shadow of Etna' (Boston 1896).

JAMES GEDDES, JR.
Professor of Romance Languages, Boston University.

CAVALLERIA RUSTICANA, grand opera in one act by Pietro Mascagni (libretto by Targioni-Tozzetti and Menasci, founded on a tale by Verga), first produced at Rome, 17 May 1890. Awarded the prize in a competition for one-act operas offered by the publisher Sozogno, 'Cavalleria Rusticana' launched its composer into world-wide prominence and founded a school of well-defined proportions. All Italy went wild over the work and Mascagni was hailed as the legitimate successor of Verdi. Everywhere the opera created a furore. In New York two managers vied with each other to be the first in the field, with the result that two productions were given in New York on 1 Oct. 1891 and the question of priority rights had to be settled by the courts. In the meantime, both Philadelphia and Chicago had heard it. The compressed emotional appeal of the work swept critical judgment off its feet. The hot-blooded passion of the story was raised to a higher power by the music, turbulent, theatrical, but persuasive. The vein tapped by the composer was not all precious metal and it petered out suddenly; but while it lasted, the rewards were rich. The Intermezzo alone, an eloquent advance agent of the opera, must have poured a fortune into the composer's pockets. The Siciliana sung by Turridu, Santuzza's romance, the Drinking Song and Lola's aria are all melodious and easily remembered. The orchestration is often crude and blatant, but not unsuited as a vehicle for the "veristic" and melodramatic musical expression. Operatic annals contain few such sensational and meteoric careers as that of 'Cavalleria Rusticana,' with the fortunes of which its composer's fame has been inextricably bound up. Emma Calvé's impersonation of Santuzza is one of the outstanding histrionic

features of modern operatic history. For the outline of the story see CAVALLERIA RUSTICANA.

LEWIS M. ISAACS.

CAVALLI, kä-vä'lē, **Pietro Francesco,** Italian composer: b. Crema about 1600; d. Venice, 14 Jan. 1676. The name by which he is known was assumed by him in honor of his patron, Federigo Cavalli, podestà of Crema. His real name was Pietro Francesco Caletti Bruni. He studied under Monteverde whose style he continued. In 1665, he became organist at San Marco, and in 1668, *Maestro di capella,* or "chapelmaster," which office he held for the rest of his life. He is best remembered for his work in dramatic operas. He introduced solos, freer rhythm and widened the scope of dramatic possibilities. In all of this he was the direct forerunner of Scarlatti who developed opera along these lines. In spite of obvious crudities of style and weakness of harmony, Cavalli's 42 operas are still noteworthy productions. Among his numerous works may be mentioned 'Le Nozze di Tetide e di Peleo' (1639); 'Il Giasone' (1649); 'L'Artemisia' (1656). In 1656, a collection of his church music was printed at Venice.

CAVALLO, Tiberius, Italian physician and inventor: b. Naples, March 1749; d. London December 1809. He early removed to England, where he published, in 1775, a notice of 'Extraordinary Electricity Observed at Islington.' He invented several ingenious instruments for electrical and chemical experiments. His apparatus for measuring the force and quantity of electricity is remarkably delicate and accurate. In 1779 he was admitted to the Royal Society. His study of the influence of air and light on plant development was brilliantly original, and paved the way for valuable discoveries in organic life. He wrote 'Medical Electricity' (1780); 'A Treatise on the Nature and Properties of Air, etc.' (1781); 'Complete Treatise on Electricity' (1786); 'Treatise on Magnetism in Theory and Practice' (1787); 'Elements of Natural and Experimental Philosophy' (1803), and other scientific works.

CAVALLY, one of the popular names of the horse-mackerel, *Carangus hippos,* called also horse-crevallé and jack. It belongs to the family *Carangidæ* (q.v.), and is distinguished by the black spots on the operculum and the pectoral fin.

CAVALOTTI, kä-väl-ōt'tē, **Felice,** Italian statesman and poet: b. Milan, 6 Nov. 1842; d. Rome, 6 March 1898. He fought under Garibaldi and gained celebrity; was a political journalist. Elected to the Italian Parliament (1868), he opposed Crispi and became an extreme Republican, opposing the monarchy with great vigor. He was repeatedly sentenced to imprisonment. He fought 32 duels and was finally killed. The most noted of his tragedies are 'Agnes de Gonzaga'; and 'Alcibiades' (1874). He also published volumes of lyric verse, his best work being 'The Canticle of Canticles.'

CAVALRY, term used to designate soldiers trained to fight mounted and sometimes employed on foot. The decisive power and value of cavalry lie in its mobility and in opposing infantry. On foot, the cavalry of to-day can attack positions with the same resolution and determination as can infantry. They use the same weapon — the rifle — and the cavalryman of to-day is the rifleman on horseback who can quickly convert himself into a rifleman on foot, ready to receive and repel the mounted charge of cavalry. There are enormous possibilities for the horseman of the future armed with the rifle, with a great extension of modern battle lines modified by the development of mounted infantry ready to throw itself on the rear or flanks of the distant enemy. The cavalry action of the future can be conceived by a comparison of the cavalry of the Civil War, the Boer War and the European War with that of Wagram and Waterloo.

Cavalry as a distinct military organization dates back prior to the Trojan War. Xenephon relates that in the first Messenian War, 743 B.C., Lycurgus formed his cavalry in divisions. In the war 371 B.C., Epaminondas had a cavalry force of 5,000 men, and we know their cavalry contributed greatly to the victories of Philip and Alexander of Macedon. It had an important part in the battle of the Granicus, 334 B.C.; and at the battle of Arbela, 331 B.C., Alexander, who led the Macedonian cavalry of 7,000 men, dashed into a gap of the Persian army, and by this brilliant feat utterly routed the enemy. The Roman cavalry was very inferior to that of Hamilcar and Hannibal and most of the victories of these two generals were won by cavalry over the splendid infantry of the Romans. Publius Scipio's defeat at the Ticinus, 218 B.C., was due to the superiority of the Carthaginian horse; and the bitter experience at the Trebia and the battle of Cannæ, 216 B.C., taught the Romans the value of cavalry, by which Scipio finally defeated Hannibal at Zama, 202 B.C. Vegetius states that the Roman cavalry was organized into 10 troops or squadrons, forming a regiment of 726 horses, generally attached to some special legion. It is a singular fact that saddles were not in use until the time of Constantine, and stirrups were introduced by the Franks in the 5th century. During the Middle Ages cavalry may be said to have constituted almost the only efficient arm of battle. This was owing to the unwillingness of the nobility in all countries of western Europe to entrust any military power to the serfs; the upper classes went into battle mounted, and both riders and horses had heavy defensive armor. The feudal cavalry consisted of mail-clad knights with their men-at-arms. Their weapons were lances, battle-axes and swords. The infantry was looked down upon during the Middle Ages, being composed principally of serfs and such as had not the means to keep a horse; but with the invention of gunpowder, the introduction of muskets and the use of field artillery a complete change took place; the infantry gradually rose in reputation, and the number of this class of troops was augmented. It seems that light cavalry did not exist as a distinct body, with general officers and a staff, before the time of Louis XII. Montluc, however, mentions a general of 12,000 light horse in the time of that monarch; and we hear of Henry II, in 1552, taking a troop of 3,000 cavalry in his expedition to Germany. In 1554 Marshal De Brissac formed a corps of mounted infantry, called Dragoons,

trained to fight either on horseback or on foot. Maurice of Nassau, who saw the importance of giving more mobility to this arm, was the first to organize cavalry regiments, each regiment being composed of four squadrons, formed in five ranks, and numbering about 1,000 horses. Gustavus Adolphus was a great cavalry general, and used his cuirassiers and dragoons to good advantage. His tactics were much admired, and were adopted by many European nations. The French, especially, distinguished themselves after his death in the employment of cavalry. Turenne, Condé, Montecuculi and Marlborough were considered excellent cavalry leaders. Cromwell was indebted to his abilities as a cavalry officer for the victories of Marston Moor and Naseby. Defensive armor for cavalry had been abolished in his time, and the cavalry troops were taught to use the carbine. Charges of cavalry were seldom made in battle except by the French. Marshal Saxe made many improvements in this arm, and used guns in connection with cavalry at the battle of Fonten-oy, although regular horse-artillery was not introduced till 1762. It was not until the wars of Frederick the Great, however, that the full importance of cavalry was developed; he saw the necessity of training these troops to use swords instead of firearms, and endeavored to make them perfect riders. No firing whatever was allowed in the battle during the first charge; he claimed that the only two things required to beat the enemy were to charge him with the greatest possible speed and force, and then outflank him. The brilliant victories he obtained from the adoption of these tactics under the able leadership of Seydlitz have probably never been excelled. At the battle of Hohenfriedberg the Prussian cavalry of 10 squadrons broke 21 battalions, routed the entire left wing of the Austrian infantry and captured 66 standards, 5 guns and 4,000 prisoners. Frederick had learned to appreciate the true principles of mounted warfare through long experience and the occasional disasters which he had met in the first and second Silesian wars; and it was due to the efficient reforms which he instituted in the Prussian cavalry that he was able to win the battles of Rossbach, Striegau, Kesselsdorf, Leuthen and others. One of the first improvements made in the French army by Napoleon was the reorganization of the cavalry. He increased the cuirassiers from one regiment to 12, and reintroduced the use of the lance and defensive armor. Some of his splendid victories were due to this force, especially at Marengo and Austerlitz; and it was owing to the loss of the French cavalry in the Russian campaign of 1812 that some of his finest achievements in 1813 proved useless; he was well aware of this, and made the statement that had he possessed cavalry at the battles of Lützen and Bautzen the war would then have been brought to an end.

In modern warfare it may be mentioned that cavalry was conspicuous at the battle of Solferino; but in 1866, the first great European war since Waterloo, neither the Austrian nor the Prussian cavalry won great distinction, although the manner in which the Austrian cavalry covered the retreat of their army at the battle of Königgrätz was a noble example of courage and devotion. In the Franco-Prussian War of 1870, however, the excellence of the Prussian cavalry was the chief means of Von Moltke's ability to carry out his strategic plans. The French cavalry were more remarkable for bravery than efficiency. Great progress was made in the cavalry of the United States during the Civil War; a large number of men of both armies were good riders, and understood the management of horses. They were at first, however, quite ignorant of military tactics, and were used as scouts, as orderlies and for outpost service. General Sheridan, acting under instructions from General Grant, made the first successful organization of cavalry, which was called the Cavalry Corps of the Army of the Potomac, comprising three divisions of 5,000 mounted men each. Their weapons were repeating carbines and sabres. It was with this force that he defeated the Confederate cavalry at Yellow Tavern, near Richmond; and it contributed largely to the defeat of Early at the battle of the Opequan, near Winchester; and later, at the battles near Petersburg and at Five Forks, the cavalry took an important part. General Wilson, whom General Sherman put in command of a force called the Cavalry Corps of the Military Division of Mississippi, did good work in the organization toward the close of the war; he had 12,000 mounted cavalry and 3,000 who fought on foot at the battle of Nashville, not including a detachment of 3,000 men in Kentucky.

Cavalry is usually placed in the rear of the infantry on ground favorable to its manœuvres, and where it will be masked from fire until the moment arrives to bring it into action; here, if acting on the defensive, the cavalry watches its opportunity to support the other troops, driving back the enemy, by prompt and vigorous charges, when these are hard pressed; or, if on the offensive, biding its time, to rush upon the assailant, and complete his destruction, when his ranks commence to waver or show signs of disorganization from the assaults of the other arms. Its habitual formation for the attack is in a line of two ranks, with a reserve, or support, to its rear. The supports are indispensably requisite to guard against those chances of danger in which cavalry is particularly exposed, if attacked in turn, when in a state of partial disorganization, after a successful charge; or when threatened by an offensive movement against its flanks. The supports offer a safeguard against either of these dangers; for, if the front line is brought up by the enemy, after a successful charge, it can retire and rally in the rear of the supports; and if the enemy makes a movement against the flanks, the supports, placed behind them and in column, can form and anticipate the enemy's charge. For the foregoing reasons, cavalry should not give way to a headlong pursuit after a successful charge, unless its supports are at hand; and in cases where a charge is made without supports, a portion only should engage in pursuit, the rest being rallied to form a support.

A body of cavalry which waits to receive a charge of cavalry, or is exposed to a fire of infantry or artillery, must either retire or be destroyed. This essential quality of cavalry renders its services invaluable in retreats where the enemy pursues with vigor. In such cases it should be held in constant readiness to take

advantage of every spot favorable to its action, and, by short and energetic charges, force the enemy to move with circumspection. So long as infantry maintains its position firmly, particularly if the ground is at all unfavorable to the movements of cavalry, the chances are against a successful attack by the latter. Cavalry should therefore either wait patiently until a way is prepared for its action, by a fire of artillery on the enemy's infantry; or until the infantry has become crippled and exhausted by being kept in action for some time; or else, watching its opportunity, make a charge whilst the infantry is in motion, so as to surprise it before it can form to receive the attack.

Cavalry should direct its charge on that point of the enemy's infantry where it will itself be exposed to the least column of fire. If the infantry is in line, the charge should be made on one of its flanks; if in square, on one of the angles of the square; and when several squares are formed, so as to afford mutual support by their fire, selecting the squares on the flanks as most vulnerable, from their position. The formation usually recommended for charging against squares is that of three squadrons in line at double distance; the leading squadron being followed by the others, either directly in its rear, or else the squadrons may be formed in echelon, successively overlapping each other by about the front of a platoon. The angle of the square is charged by each squadron in succession, if the charge of the one preceding it fails; the repulsed squadrons each wheeling to the right or left on retiring, to leave the way clear for its successor. A fourth squadron in column follows those in line, to surround the square and make prisoners if it should be broken by the charge. To draw the fire of the infantry before charging, a few skilful flankers may be thrown forward to open a fire on the square. Stratagem may also be tried, by moving along the front of the infantry, and then charging, if it is tempted to throw away its fire.

In attacks against artillery, the detachment of cavalry should be divided into three bodies; one-fourth of the detachment being charged with carrying the guns, one-half to attack the supports of the battery and the remaining fourth acting as a reserve, to cover the parties in advance from an offensive movement against their flanks or rear. The party to secure the guns make their attack in dispersed order, and endeavor to gain the flanks of the battery. When the battery has a fair sweep over the ground along which they must advance, they should, by manœuvring and false attacks, try to confuse the artillerists, and draw their fire before making their charge.

So far as concerns actual duties, heavy cavalry charge the enemy's cavalry and infantry, attack the guns and cover a retreat: while the light cavalry make reconnaissances, carry dispatches and messages, maintain outposts, supply pickets, scour the country for forage, and the commissariat, pursue the enemy and try to screen the movements of the infantry by their rapid manœuvres on the front and flanks of their army. At the battle of Balaklava the heavy cavalry charge was within the reasonable duties of the troops, but that of the light cavalry was not; the former succeeded, the latter failed. Cavalry cannot wait to receive an attack like infantry; they must either pursue or retreat; and on this account it has been said, "Rest is incompatible with cavalry." The infantry and artillery more frequently win the victory; but the cavalry prepare the way for doing this, capture prisoners and trophies, pursue the flying enemy, rapidly succor a menaced point and cover the retreat of infantry and artillery, if retreat be necessary.

If we study the conditions of modern cavalry action, it is clearly seen that no one particular formation can be rigidly insisted upon for the mounted charge against cavalry. The development of long range firearms, their rapidity of fire and great accuracy, has made it possible for cavalry having time to dismount and form up to repel the attack of horsemen as effectively as can "unshaken infantry." By dismounting and using the rifle on foot the cavalry will be able to decimate the attacking force and throw it into utter confusion long before it reaches its objective. Dismounted action in future wars will be the rule, mounted attack the exception.

The battle attacks of the cavalry of the First Empire were simplicity itself. Placed close to the front, it was drawn up in successive lines of regiments or brigades, with the light cavalry in front, behind them the dragoons and in rear of all the cuirassiers. The lines thus placed one behind the other formed *une colonne serrée*. It attacked in successive lines of regiments or brigades at varying intervals, according to the course of events. After the charge or the *mêlée* the rally was to the flanks, where column was rapidly formed in order, if necessary, to advance again by passing through the intervals of the supporting lines. There was little occasion for manœuvre, owing to the proximity of the cavalry to the front, but all movements were executed at the trot, the gallop only being sounded for the last 100 or 150 yards. Practically the only manœuvre attempted was to take ground to the right or left and form again to the front; the success of the charge was due to the irresistible onset of the successive lines and the skill in the *mêlée* of the individual swordsman, the whole constituting a moral factor of the first importance and value.

The question is asked: Why, cavalry having attained such super-excellence under Napoleon, has it come to pass that in none of the succeeding wars from 1815 to 1870 is there any trace of the same *emploi intensif?* The same thing had already been noticed before in the Prussian cavalry of Frederick; in both cavalries there was a period of uniform success; in both of them when at their zenith the principles of organization were simple, the distribution supple and elastic, the commanders young and brilliant and the employment of the arm was the actual embodiment of the offensive spirit. Either cavalry attained its apogee, followed by a period of decadence; each in turn was content to rest upon its past fame, to rely merely upon tradition, until reverses and disaster led each in succession to examine into and correct the causes which had resulted in its overthrow. It is found that during long years of peace men fall back upon mere formula, trust to theory rather than to practice, consult schoolmen rather than leaders; that during peace time the natural tendency is to place undue reliance

upon regulations, form and *dilettantisme tactique*, while overlooking the factors of energy and overpowering moral force which, through all material changes in armament, must ever remain among the keenest weapons of cavalry.

After the war of 1870 it was generally believed that cavalry was no longer a weapon for the battle, that all that could be asked of it were certain vaguely defined duties of reconnaissance; it was then recognized that opposing cavalries must meet and fight, and by both German and French authorities it was conceded that the first duty of cavalry is to defeat the cavalry of the opponent, while many efforts were made to formulate a doctrine of profitable employment. This heroic age, when it seemed that cavalry should be employed again in masses and by shock, was followed by the Russo-Turkish, the South African and the Manchurian campaigns, where such methods were impracticable, and a reaction set in in favor of the employment of smaller units and of fire action.

The Franco-Prussian War put emphasis upon the reconnaissance duties of cavalry, because the German cavalry took advantage of the fact that the French cavalry mostly was kept concentrated and with the infantry to spread out far in front of the German armies for reconnaissance purposes; also because both cavalries disdained to fight on foot and, therefore, contented themselves with waiting for opportunities to make mounted attacks. These opportunities came but seldom, and in the majority of cases furnished examples of the failure of the mounted attack rather than the reverse.

Cavalry officers in all countries have felt for years that undue emphasis was being put on the reconnaissance duties of cavalry, and that cavalry should not consider itself an obsolete fighting arm merely because it cannot habitually use the sabre, any more than infantry should rule itself off the battlefield because it cannot habitually use the bayonet. These cavalry officers have welcomed the possibility of the aeroplane taking over the duties of reconnaissance from the cavalry, as that means the end of the period in which cavalry has been split up into small bodies, and the return to its use in large bodies under cavalry leaders. In other words, its use would be on a much larger scale but in the same manner in which Sheridan in the closing days of the Civil War cut off and destroyed Ewell, Lee's rear guard, and afterward stopped Lee until the infantry could arrive.

In the great European War cavalry was indispensable and variously employed as a cavalry screen; in reconnaissance; in patrol duty; in protecting flanks of armies; in filling gaps between armies; in acting as advance and rear guards; in pursuing the enemy as independent cavalry; escorting large bodies of infantry and machine guns moving in automobiles; seizing and holding important positions until the infantry could come up; holding long stretches of trenches; and acting as a mobile reserve in rear of the trenches. As a result of experience in the Boer War in 1901, in the British drill book the rifle was declared "the principal weapon of cavalry." But later when a new drill book was issued in 1907, the policy changed, and the *arme blanche* was declared to be the cavalry's main reliance. The Boer War was the greatest demonstration of the value of the mounted rifleman the world has ever seen. It confirmed the experience of the American Civil War. But the lessons it taught Europe went unheeded and in 1914 the French, Austrian and Italian cavalry were armed with a carbine of little or no value, while in none of these armies was the cavalry properly or sufficiently trained in marksmanship or in dismounted action, and as a result, great masses of cavalry were obliged to stand helpless, useless and impotent spectators of fierce battles, whereas had they been trained to use the rifle, they could have moved with the speed of horsemen and fought with determination of infantry.

Cavalry played a significant rôle on both sides in the Allied retreat and the German advance to the Marne. During the battle of the Marne, the German cavalry held the gap in the German line between von Kluck's flank guard north of Meaux and his main force on the right flank of the German line. When the Allies were endeavoring to extend their line to Antwerp, and the Germans were trying to reach the Belgian coast, the cavalry of both sides played an extremely important part in the region of Lille and Ypres; in fact, a large part of all the early engagements in this region were fought by cavalry. See AMMUNITION; ARTILLERY; INFANTRY.

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EDWARD S. FARROW,
Consulting Civil and Military Engineer.

CAVAN, Ireland, a county in the province of Ulster, having Fermanagh and Monaghan on the north, Leitrim on the west, Longford and Westmeath on the south and Louth on the east; area, 746 square miles. In the northwestern part is a range of hills called the Ballymageeragh Mountains, but the remaining surface, which is undulating and irregular, is pervaded by bog and interspersed with many fine lakes. The chief rivers are the Erne, the Woodford, the Blackwater and the Annalee, and the chief lakes Lough Ramor, Lough Sheelin, Lough Gowna, Lough Oughter and Upper Lough Erne. Mineral springs are numerous. Much of the soil of this county is cold, spongy and inclined to be rushy. The chief cereal crop is oats, the chief green crop potatoes. Wheat is little cultivated; flax is raised to some extent, and the high lands are good for grazing. Linen-bleaching and the distilling of whisky

are the chief industries. The principal towns are Cavan, Cootehill and Belturbet. There are some interesting architectural remains. The county returns two members to Parliament. Pop. (1911) 74,271, of which 81.4 per cent is Roman Catholic.

CAVAN, Ireland, town, capital and chief business centre of the above county, 57 miles northwest of Dublin. It has an endowed school founded by Charles I, and a Roman Catholic college, and has some trade in linen. Pop. (1911) 2,961.

CAVANILLES, kä-vä-nēl'yĕs, **Antonio José,** Spanish clergyman and botanist: b. Valencia 1745; d. Madrid 1804. In 1777 he went to Paris and remained there 12 years, occupied with the study of several sciences, but chiefly with botany. In 1785–86 he wrote his great botanical work, 'Monadelphiæ Classis Dissertationes decem' (Paris 1785–89; Madrid 1790, 4to, with engravings). After his return to Spain he wrote 'Icones et Descriptiones Plantarum, quæ aut sponte in Hispania crescunt aut in Hortis hospitantur' (1791–99, 6 vols., folio, with 601 engravings). In pursuance of a commission from the King, Cavanilles traveled in Valencia, and collected the materials for his 'Observaciones sobre la Historia Natural, Geografia, Agricultura, Poblacion, etc., del Reino de Valencia' (1795–97, 2 vols., folio, with copperplates from the drawings of the author). The work was published at the expense of the King, and intended as the first part of a similar work to embrace the whole of Spain. Thunberg has named a family of plants Cavanilla. His nephew ANTONIO CAVANILLES (1805–64) was a distinguished advocate and the author of a history of Spain (Madrid 1869–64).

CAVATINA, kăv-ą-tē'nạ, in music, a short operatic air without a return or second part, maintaining the same tempo throughout, sometimes relieved with recitative, but now extended to the aria generally, especially if the character of expression is tender, hopeful or joyous. In this elegant and gracefully melodic class of composition the Italians naturally eclipse all other musicians; yet the *Il mio Tesoro* of Mozart will bear comparison with the finest cavatinas ever written.

CAVE, or **CAVERN,** an opening produced by nature in the solid crust of the earth. Caves are principally met with in limestone and gypsum as a result of the solvent action of ordinary circulating underground water. Less often they occur in sandstone, and in volcanic rocks (basalt, lava, tufa, etc.). The form of the caves depends partly upon the nature of the substance in which they exist; but it is frequently altered by external causes. Out of some caverns rivers take their course; others again admit rivers, or may be said to swallow them for a space. There are many and various causes for the formation of caves. Those in limestone and gypsum are unquestionably the results of the dissolving power of water; in fact the almost perfectly uniform direction, the gentle and equable declivity of most caves, appear to be the effect of the long continuance of water in them, the action of which has widened the existing crevices. In trachyte and lava, caves appear to have been produced by the effects of gas. The caves of gypsum often contain foul air; the caves of limestone are commonly marked by various figures of stalactites, produced by the deposit of the lime dissolved in the water. Many of these lime caves contain remnants of bones of animals, such as hyænas, elephants and bears. See CAVE-DWELLERS.

Many caves are remarkable only on account of their great size, or sublime from the awful gloom which pervades them, and the echoes which roll like thunder through their vaulted passages. Some are of great depth, as that of Frederikshall, Norway, calculated to be several thousand feet in depth. One of the grandest natural caverns known is Fingal's Cave (q.v.) in Staffa, one of the Western Islands of Scotland. Its sides are formed of ranges of basaltic columns, which are almost as regular as hewn stone. The grotto of Antiparos, on the island of the same name, in the Grecian Archipelago, is celebrated for its magnificence. The roof is adorned with stalactites, many of them 20 feet long, and hung with festoons of various forms and brilliant appearance. In some parts immense columns descend to the floor; others present the appearance of trees and brooks turned to marble. The Peak Cavern in Derbyshire, England, is a celebrated curiosity of this kind. It is nearly half a mile in length; and, at its lowest part, 600 feet below the surface. Other famous stalactitic caves are the Luray Cavern (q.v.), Page County, Va.; one near Matanzas, Cuba; one near Adelsberg, Carniola; the Wyandotte Cave (q.v.), Crawford County, Ind.; and Madison's Cave, in Rockingham County, Va. The caves of Kirkdale, in England, and Gailenreuth, in Germany, are remarkable for the quantities of bones of the elephant, rhinoceros and hyæna found in them. In the rock of Gibraltar there are a number of stalactitic caverns, of which the principal is Saint Michael's Cave, many feet above the sea. Other celebrated caves in America are Weyer's Cave, in Augusta County, Va., extending 800 yards, but extremely irregular; the Colossal Cavern, Ky. (q.v.), discovered in 1895, and the Mammoth Cave (q.v.) in Edmondson County, Ky., which encloses an extent of about 150 miles of subterraneous windings. One of its chambers, called the Temple, covers a space of nearly five acres, and is surmounted by a dome of solid rock 120 feet in height. The Cumberland Mountains, in Tennessee, contain some curious caverns, in one of which, at a depth of 400 feet, a stream was found with a current sufficiently powerful to turn a mill. Another cave in the same State is named Big Bone Cave, from the bones of the mastodon which have there been discovered. In the Raccoon Mountains, near the northwestern extremity of Georgia, is Nickojack Cave, 50 feet high and 100 feet wide, which has been explored to the distance of three miles. A stream of considerable size, which is interrupted by a fall, runs through it. The Ozark region of Missouri is noted for its numerous caves, among which Onondaga cavern is perhaps the best known. Caves are sometimes found which exhale poisonous vapors. The most remarkable known is the Grotto del Cane, a small cave near Naples. In Iceland and Hawaii there are many caves formed by the lava from volcanoes. In the volcanic country near Rome there are many natural cavities of great extent and coolness, which are sometimes

resorted to as a refuge from the heat. In South America is the cavern of Guacharo, which is said to extend for leagues. For information concerning human and animal remains in caves, see CAVE-DWELLERS and consult works there referred to. See also section on work of ground water, in article on GEOLOGY.

CAVE ANIMALS. The animal life of caverns falls into three categories: 1. Animals, mostly extinct, that made their dens or left their bones in caves, and in life were members of the next group. 2. Animals that temporarily, but habitually, resort to caves for refuge, or sleep, or as breeding-places. 3. Animals, degenerate, confined to an underground life throughout their whole existence. None of these classes include those making small caves for themselves, the burrowers; or which, like the mole and many insects, dwell in the soil; or, like the conies (Hyrax), the pikas and several sea-birds, spiders, etc., seek safe homes among the interstices of loose rocks.

Prehistoric Cave Beasts.— The first group will require little space, as it consists of such extinct animals as the cave bear, cave lions, cave leopard, cave hyæna, cave wolf and some smaller ones that have been given these names because their bones and portraits have been found abundantly in the floors or on the walls of caverns in Europe and Africa. Indications trusted by geologists and archæologists combine to show that these animals lived there in the latter part, at least, of the third Inter-glacial Epoch, and on through the fourth and last glacial advance, when, although central Europe was free from an ice-cap, an almost Arctic climate prevailed, with much rain. This is what is known as the Reindeer Period, when humanity was represented by the Neanderthal race (see STONE AGE). The weaker part of the fauna disappeared, but those hardy carnivores, finding food still plentiful, gradually adapted themselves by increased hairiness to the cold climate; but apparently they resorted far more than previously to the shelter of caves. None of those mentioned above is regarded as anything but a larger, more vigorous variety (*spelæa*) of the lion, leopard, wolf, spotted hyæna, etc., except the cave bear (*Ursus spelæus*). This beast was the most thoroughly spelæan of all in its habits, and occupied caves before men began to do so. It was not much if any larger than the ordinary brown bear of to-day, and its claws were shorter and feebler. "Hence it would appear," says Osborn, "that the Neanderthals had driven out from the caves a type of bear less formidable than the existing species, but nevertheless a serious opponent to men armed with the small weapons of the Mousterian period." Probably fire and smoke were the most effective means. These bears were numerous, for game was abundant. A single cavern in western France has yielded remains of more than 800 skeletons; and from these bones and from prehistoric drawings it is possible to know this animal perfectly. With the close of the last period of partial glaciation, and the return in the early Pleistocene of the moderate climate that still continues, these and the other cave-haunting beasts disappeared, largely, no doubt, killed off by the better-armed Neolithic hunters. The great bear left no descendants, for the modern European brown bear traces its lineage to an older and smaller species, the Etruscan bear, whose bones also are occasionally exhumed from cave-floors.

Caves in North America present different conditions from those of Europe. Those that have yielded animal remains, such as the Port Kennedy and Frankstown "caves" in Pennsylvania, and the Concord Fissure in Arkansas, "are hardly caverns," says Scott, "in the ordinary sense of the word, but rather narrow fissures, into which bones and carcasses were washed by floods." They contain a great variety of mid-Pleistocene species, at least half of which are extinct. Big Bone Lick Cave, in Kentucky, is more truly a cave, and has furnished palæontology with an immense supply of bones of recent time, including several ancient species, such as mastodons, mammoths and the ground-sloth, Megalonyx, and with certain traces of human presence. Caves in northern California are also rich in animal remains, illustrating the transition from glacial to modern faunas. Brazilian caverns have yielded much also; and a cavern near Last Hope Inlet, Patagonia, is noteworthy for the finding in it of the bones, and large pieces of the skin, of a great extinct sloth (Megatherium) with the hair still on.

Temporary Tenants of Caves.— In modern times, as anciently, bears and other carnivores use caves as sleeping-places when it is convenient, but they are exclusively resorted to by a few kinds of creatures that may properly be called cave-tenants. The most characteristic of these probably are certain bats, especially such insect-eating kinds as the leaf-nosed, the horseshoe and the true bats of the family Vespertilionidæ. Caves frequented by bats usually harbor enormous colonies, and one who enters and disturbs them will find himself in the midst of a whirring multitude that it taxes the powers of description to portray. Some caves long occupied contain vast deposits of the richest possible guano, and this has been extensively utilized in some places as a fertilizer. Such artificial caverns as the deserted tombs of Egypt are filled with bats, one species of which is popularly called tomb-bat, and abounds in the interior of the Great Pyramid.

Birds of two sorts are cave-tenants. The most singular, probably, is the large guacharo, or oil-bird, of the family *Steatornithidæ*, classified between the nightjars and the owls, and inhabiting northern South America and the island of Trinidad. It inhabits both sea-side and mountain caverns, going forth only at dusk to get its food, which is mainly fruit. "Visitors to the breeding-caves," says Evans ('Birds,' 1900) "are suddenly surrounded by a circling crowd of oil-birds uttering loud croaking or rasping cries. . . . The numerous nests . . . are flat, circular masses of a clay-like substance placed on ledges or in holes." Great numbers of these birds are killed by torch-light for the sake of the oil obtained from them, which is excellent for illumination or for cooking purposes. The other birds choosing sea-caves as a breeding-place are swifts of the genus Collocalia, whose nests are placed in the depths of caves on the coasts of Ceylon, and eastward and southward to northern Australia. The best known of the many species is that which produces the edible nest of which the Chinese are so fond. Huge numbers of these swifts breed

in company in dark caves, where they are associated with bats; but the bats go outside at night and the swifts by day. Such caves contain exceedingly rich deposits of guano, and return to their owners a large rental for the right to gather the swifts' nests glued to their walls and roofs. See SWIFTS.

Blind Inhabitants.— A special cave-fauna exists in all parts of the world, consisting of an assemblage of animals of different classes which are blind, and in most cases eyeless. This fauna is evidently of great antiquity, since it exists most plentifully in caves, such as those of the limestone district of the South-Alleghanian region, and in southern Europe, which regions are south of the region of the Pleistocene glaciation. Within such caves, formed by the action of water (see CAVE), are rivers, sinkholes and deep wells, all perfectly dark, inhabited by blind amphibians, fish, crayfish and other crustaceans, and by many kinds of insects and spiders. No vegetation exists save a few scattered molds and fungi, and all the animals are carnivorous, preying on each other. Mammoth Cave in Kentucky contains about 75 species of these blind creatures, to which 40 or 50 more may be added from other southern caves; while several hundred kinds have been described from European caverns.

The most striking and interesting form in Mammoth Cave is the blind-fish (*Amblyopsis spelæus*). It is about four inches long, colorless and blind, the eyes being vestigial. This fish seeks the dark and shuns the light, being much disturbed by a lighted match or bright sunlight, or even by a ray of light. In well-fed adult specimens there is no external indication of an eye; but in young ones, before reaching a length of two inches, the eyes can be distinctly seen, owing to their pigment, which is lost in the adult. The optic nerve can be traced in examples under an inch in length. This will apply to the eyes of other blind fishes and blind insects, crustacea, etc. While the sense of sight is lost, that of touch in the blind-fish, as in most other cave animals, is exalted. *Amblyopsis* is provided with tactile papillæ, arranged in ridges on the front and sides of the head. They are said to show extreme timidity and caution in their movements.

A still higher type of vertebrate, two species of salamanders, have become adapted to cave life, losing their eyesight by disuse. The species of the genus *Spelerpes* frequent damp, dark situations and the entrances to caves. An allied form (*Typhlotriton spelæus*) is distinctly a cavernicolous as distinguished from a twilight species, and has never been found outside of caves. Its eyes show early stages of degeneration. It inhabits caves in southwestern Missouri, and occurs under rocks in and out of water. Still another salamander, whose eyes are the most degenerate known among amphibians, is the *Typhlomolge rathbuni*. It lives in subterranean streams, tapped by an artesian and also a surface well, near San Marcos, Tex., and in one of the caves near that town. Its remarkably long and slender legs are too weak to support its body when out of water.

The lower animals tell the same story of degeneration, total or partial atrophy of the eye, together with loss of color, and, in a more striking way, the compensation for the loss of vision by a great increase in length of the antennæ and other appendages, or by the growth of long, slender tactile bristles.

The blind crayfish (*Oreonectes pellucidus*) is a common cave form. It differs from its out-of-door allies in being blind, deaf, slender-bodied and colorless. Other blind or eyeless crustaceans are various kinds of amphipods and isopods, both aquatic and terrestrial, of which species of *Cæcidotea* are the most abundant, and form the food-supply of the blind crayfish.

The eyeless beetles of caves (*Anophthalmi*) have no vestige of eye or of optic nerves, while their bodies and appendages are slender. They grope their way about by means of very long tactile bristles. Other beetles, such as *Adelops*, which have retained vestiges of the outer eye; some spiders comprising an eyeless species, and others with eyes varying in size, some much reduced, spin little webs on the walls of the chambers. Among the harvestmen some (*Phalangides*) have extraordinarily long legs; while the *Campodea* (q.v.), a wingless insect of the Mammoth and other caves of the United States and Europe, differs from the outdoor form in its antennæ and abdominal appendages, being greatly exaggerated in length. There are also mites, myriapods, primitive wingless insects (*Podurans*), a few flies, worms and infusorians.

Origin and History.— The blind fauna of caves, according to Packard, is composed of the descendants of individuals which have been carried by various means into the subterranean passages, have become adapted to life in perpetual darkness, becoming isolated, and thus, as long as they are subjected to their peculiar environment, breed true to their species, and show no tendency to relapse to their originally eyed condition. The absence of the stimulus of light causes the eyes, through disuse, to undergo reduction and atrophy. With this goes, in certain forms, the loss of the optic ganglia and optic nerves.

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ERNEST INGERSOLL.

CAVE-BEAR, an extinct species of European bear closely allied to the living grizzly, but attaining a large size. Its remains are found in bone-beds in caverns, whence the name. The habits of the animal were probably not different from those of modern bears. The cave-bear of South America is a different animal. Both species are found in the larger caverns of North and South America. See BEARS.

CAVE-DWELLERS. This topic is naturally divisible into two parts — first, the prehistoric aspect, and, second, the modern human occupation. The prehistoric use of shelters and subterranean chambers by the primitive savages, often called "cave-men," was incidental to human existence before civilization, and is fully treated in the article STONE-AGE. The present article therefore avoids that phase of cave history, and is confined to the use of underground chambers, natural or artificial, by civilized mankind for dwellings, refuges, worshipping places or sepulture.

Caverns naturally occur in limestone regions,

or where soft layers of sandstone or volcanic debris alternate with harder layers (see CAVE), and are usually dry, well-ventilated, of a fairly even temperature throughout the year, and often contain streams of running water. They are, therefore, suitable enough for human habitation, and often are really attractive. It is not surprising, then, that from the earliest times caves have been adopted as human residences and storehouses, and that they continue to be so utilized in various parts of the Old World. In the Western hemisphere this practice has never been followed, the occasional exceptions here and there being negligible. The reason is that the civilization of both North and South America is an important one. The early immigrants were men and women used to building houses, and finding in the New World plenty of room and materials for house building had no need of, and felt no call to, cave-life; nor have they been driven to it by fear.

The people of the Old World, from the Mediterranean to the China Sea, on the other hand, inherited the practice from remote antiquity, and maintained it under the pressure of semi-barbarous and crowded social conditions, poverty, danger from incessant wars and robber raids, until now in many places residence in artificial or modified caves is a matter of economy, or choice, or both. This is particularly true of southwestern Europe, and especially of France, where great areas of limestone, sandstone, and volcanic breccia underlie the soil. Through these the rivers, especially in the valleys of the Loire, Dordogne and Garonne, have cut deep channels with precipitous sides. Here scores of natural caves have been human habitations from prehistoric until recent times — some even yet furnishing human homes. Baring-Gould pictures a well-known example that has been explored by antiquaries:

"At the bottom of all the deposits [constituting its floor-layers] were discovered the remains of the very earliest inhabitants, with their hearths about which they sat in nudity and split bones to extract the marrow, trimmed flints, worked horn, necklaces of pierced wolf and bear teeth; then potsherds, formed by hand long after the invention of the wheel; higher up were the arms and utensils of the Bronze Age, and the weights of nets. Above these came the remains of the Iron Age, and wheel-turned crocks. A still higher stratum surrendered a weight of a scale stamped with an effigy of the crusading King, Saint Louis (1226–70), and finally francs bearing the profile of. . . Leopold [of Belgium]."

Such a record of almost continuous occupation might be multiplied by hundreds; and in many cases such ancient resorts have been enlarged and improved. The same is true of northern Africa and northern Asia.

We have to do more especially with artificial caves dug out by men for occupation in one or another way. Thousands of habitations, stables and workshops were cut in the hillsides of Nottinghamshire and Staffordshire, in England, and many were occupied until, within a few years, the local health authorities cleared them out. Holy Austin's rock in Shropshire, a mass of red sandstone, is honeycombed with habitations, whose neatly framed windows and doors are cut through the rock wall left for a front, and which even now are greatly liked by their tenants.

The vast expanse of chalk that underlies southern England, Flanders and northern France is easily worked, yet firm enough not to fall in, or crack away, when ordinary precautions are taken by the miner, and one might almost say that wherever it is exposed in river cuttings living rooms have been dug into the cliffs. Often these are so numerous and deep, that an underground village exists. Thus near Montaire, in the department of Loir et Cher, about 150 miles south of Paris, is the little city of Trôo, at the base of a cliff of chalk. "The whole height," a recent visitor writes, "is like a sponge, perforated with passages giving access to halls, some of which are circular, and into stone chambers; and most of the homes are wholly or in part underground. The caves that are inhabited are staged one above another, some reached by stairs that are little better than ladders, and the subterranean passages running from them form a labyrinth within the bowels of the hill, and run in superposed storeys . . . The town . . . is partly built at the foot of the bluff, but very few houses are without excavated chambers, store places, or stables. The café looks ordinary enough, but enter, and you find yourself in a dungeon."

The valley of the Loir, a northern tributary of the Loire at Angers, abounds in such rock villages, and they occur in many other places in France, Spain and northern Italy. In the department of Maine et Loire, whole villages are underground. A man may utilize valuable hillside ground for a vineyard, by building walls to retain level terraces. He quarries the necessary stones from the hill and fences his property. Then for his own dwelling he cuts out chambers in the sides of his quarry, leaving a thin front wall with windows and doorways, and bores a chimney up to the surface. Near Loudon the dry moat of a mediæval castle, cut into the rock, is alive with people inhabiting tenements dug into its sides. It is true that in most cases the families living in such quarters are poor and mean — sometimes degraded; but a great many are the homes of families of honest, working folks; are decently furnished, and ornamented outwardly by ledge gardens, hanging vines and neatly curtained windows; or regular house fronts may be erected before the caves, as is well known to tourists of the "chateau country" about Tours.

Caves, natural and artificial, have been and are still valued elsewhere in the Eastern world. Villages like those described above exist in some parts of Italy, in Sicily, in Egypt and especially in Syria. Southeast of Damascus, and not far from Palmyra, is Edrei, the capital of the Amoritish King Og, ruler of Bashan, which was captured by the Israelites in the course of their conquest of Canaan. It was an underground city cut out of solid rock, which was explored some years ago by Wetzstein, who was astonished at its extent. After threading a long, downward entrance-passage he found himself in a broad street, with dwellings on each side of comfortable height and width. "The temperature was mild, the air free from unpleasant odors, and I felt not the smallest difficulty in breathing. Further along there were several cross streets, and my guide called my attention to a hole in the ceiling for air,

like three others which I afterward saw, now closed from above. Soon after we came to a market place, where for a long distance on both sides of the pretty broad street, were numerous shops in the walls, exactly in the style of the shops seen in Syrian cities. After a while we turned into a side street where a great hall, whose roof was supported by four pillars, attracted my attention. The roof, a ceiling, was formed of a single slab of jasper, perfectly smooth and of immense size.»

In this region, too, lies Petra, hidden in a gorge of savage grandeur, and often visited by tourists. It also is an excavated city, where temples with their colonnades and façades are let into the red cliff, superimposed one above another. «From the earliest recorded times the inhabitants of the district were 'Horim,' that is to say Troglodytes, whose first rude grottoes, shapeless caverns hollowed out of the hillside, have been transformed to architectural galleries decorated with statues and bas-reliefs.»

Many other most curious examples of the present occupation of cave-dwellings in the East and in northern China might be cited, especially where banks and steep hillsides of the stiff earth called *loess* have been tunneled into, and are occupied by hundreds of dwelling places in which families now live in health and contentment.

Vast numbers of caverns, with evidences of former domestic occupation, are to be seen also in the mountains about the headwaters of the Yangtse Kiang (Blue River) in southwestern China. They are now left empty, or used occasionally only as «refugees»; but in Kan-Su and Shen-Si precisely similar caverns are excavated in the hillside, and even to-day they are favorite dwellings of the people. Africa is not in general a cavernous region, because of its geology; but in south central Africa, the Bushmen were found dwelling to a considerable extent under ground. Dornan (Trans. S. African Philos. Soc. 1909) writing of such inhabited caves in Basutoland says they were the rallying points of the various clans; and Stow reports that those inhabited by the head chiefs were adorned by paintings of totemic animals and the like.

Caves as Refuges.— Caverns and underground retreats, natural and artificial, ancient and modern, have always been resorted to as hiding places, not only by individuals fleeing from persecution, or avoiding legal punishment, or for criminal concealment (as by smugglers and robbers), but by great companies of people with their goods, in times of war or other social disasters. The early history of the Jews as given in the Bible has frequent references to this resort, as when Ahab persecuted the prophets and Obadiah hid them by fifties in a cave; and as when Joshua defeated the Amorites and their five kings hid themselves in the cave at Makkedah. The same sort of thing has occurred wherever men fought in a cavernous region from the beginning of humanity to the battles in northern France in 1917, where whole regiments were concealed in subterranean chambers north of the Aisne. Nowhere was the value of such means of safety to a harassed population better illustrated than in the civil wars that have raged in southwestern China and in the tribal conflicts and blood-feuds of Afghanistan.

The Roman armies were constantly baffled by this method of escape in conquering the Armenians and Arabs in Asia Minor, or Gauls of France and the Teutonic tribes of South Germany. When the Saracens invaded France from Spain in the 8th century, they found that the inhabitants, profiting by experience, had constructed underground retreats inaccessible to them, and by this means, almost alone, was the country saved from utter depopulation. Scarcely a century passed for several hundred years that this dreadful experience was not repeated at the hands of the Northmen (9th century); at the hands of English conquerors (12th century); at the hands of the Pope of Rome in the persecution of the Albigenses (14th century) and at the hands of local robber barons all the time.

It did not take long for the defenseless peasantry and townsmen to learn that their natural caves were not capacious enough to house the people, and they began to construct great subterranean halls, usually beneath their farms and villages, but often high in the faces of cliffs and ways so difficult of access that one man could defend the ladder or narrow stairs by which they were reached. Hundreds of such underground, labyrinthine, caves of refuge, are known in southern and central France, and have been surveyed and described by French antiquaries, each large enough to contain the people of the neighborhood, with much property and provisions for a siege. Lacoste, in his 'History of Quercy,' remarks that in Lower Quercy the inhabitants dug *souterrains* with a labor that only love of life could prompt. «Three of vast extent have been discovered at Fontanes, Mondoumerc, and Olmie . . . The vastest and most remarkable for its extent and the labor devoted to it is at Olmie. The chambers are scooped out of a very hard sandstone. In some of them are little wells or reservoirs that were filled with water as a precaution against thirst.» The entrance to such a hiding place was carefully concealed in a cellar, or under a movable stone in a church floor, or in a thicket; and all the excavated material was widely scattered so as not to betray the place.

It was the duty of every feudal *seigneur* to protect his vassals in return for their fealty and service; and every old castle in southern Europe built in feudal times, almost always in some high and preferably isolated situation, stands on rock drilled through and through with galleries and chambers. «On the alarm being given,» in the words of Baring-Gould, «of the approach of an army marching through the land . . . or the hovering of a band of brigands over the spot, within a few hours all this underground world was filled with plows, looms, bedding, garments, household stuff of every description, and rang with the bleating of sheep, the lowing of oxen, the neighing of horses, and the whimpering of women and children.» This writer gives a list of 49 places in the department of Vienne alone, where such grottoes have been discovered, mostly under churches and castles, and we believe his statement that they number thousands in France alone. Where the entrance was not within the walls of a castle, defenses were arranged against assault. The entrance was very narrow, steeply inclined, provided with concealed pitfalls, and defended

by interior doors and by side-galleries from which entering assailants might be speared or otherwise attacked. Nevertheless horrible tales remain in history of large numbers of persons being burnt out, or suffocated by smoke in these caves, or walled up by their enemies and left to starve.

Such *souterrains* abound in the northwest of France, also, where the most dreadful wars and oppression have swept the land again and again. Not only under villages, but beneath the scattered woodlands, the chalk was (and is) riddled with chambers and passages like an ant's nest. Victor Hugo has given, in his 'Quatre-vingt Treize,' a vivid picture of this state of things in Brittany at the time of the dreadful peasant uprising called La Vendée (1793–96). "The gloomy Breton forests," he tells us, were servants and accomplices in the rebellion." The subsoil of every forest was a sort of sponge pierced and traversed in all directions by a secret highway of mines, cells and galleries. The underground belligerents lurking in these hovels under trap-doors were kept perfectly informed of what was going on, and would spring up under the feet, or just behind the heels of their ambushed foes. Hugo asserts that in Isle-et-Villaine, in the forest of Pertre, not a human trace was to be found, yet there were collected 6,000 men under Focard. "In the forest of Meullac, in Morhiban, not a soul was to be seen, yet it held 8,000 men." No wonder Napoleon's recruiting-sergeants could find few young men to impress, in the latter years of his campaigns — they had all run to their holes like scared rabbits.

The same arrangements for safety from massacre and robbery were made farther north; and we are assured by a recent historian that "it may safely be said that there is scarcely a village between Arras and Amiens and between Roye and the sea, betwixt the courses of the Somme and Authie, that was not provided with these underground refuges." One wonders how large a part they have played in the great war that began there in 1914. It is evident that the "dugouts" and other subterranean defenses that held so large a place in the campaigns that followed were not as novel devices as the surprised Western world considered them.

Caves as Places of Religious Worship.— Whether or not the prehistoric peoples, the cave-men, decorated their cabins with religious intent, or whether anything in the way of worship was connected with them, is a matter on which archæologists are undecided. Primitive man was a worshipper of nature, in the sense that he feared and tried to conciliate the powerful unseen agencies that he believed filled the universe. Supreme among the natural manifestations was the sun, and, as opposed to its brightness, the powers of evil worked in and were represented by darkness. Hence caves, unlighted, deep and mysterious, were logically regarded as abodes of malignant spirits, and perhaps as opening to the dark and horrid underworld. "The Zulus," says Tylor, "can show the holes where one can descend by a cavern into the underworld of the dead, an idea well-known in the classic lake Avernus, and which has lasted on to our own day in Saint Patrick's Purgatory in Lough Dearg [Ireland.]" Such holes might call for propitiatory offerings, but would not become temples of uplifting worship. In various parts of the world, however, grottoes were used for the disposal of the dead, and in Egypt this became a cult of tremendous influence on the people, who, as they advanced, constructed elaborate, rock-cut tombs. Their growing belief in the immortality of the soul — nowhere more thoroughly realized — led to ceremonials of remembrance and ancestor-worship that developed into a philosophy that led to the erection of temples, and some of these temples were carved out of solid rock, with an ornate, architectural entrance (see EGYPT). The same sequence of religious philosophy seems to have occurred in the valley of the Euphrates as in that of the Nile. The form of their ancient temples verifies the tradition of the Chaldees that they were evolved from tombs.

The wonderful cave temples of India, especially those of Elephanta Island, near Bombay, are well known, or may be studied in the elaborate book 'Cave-temples of India,' by Ferguson and Burgess. Those of Elephanta are Hindu (Sivaistic), but more than 500 excavations made in ancient times by Buddhists for the purposes of worship are known in northwest India. Buddhist temples in caves, many of them still visited on holy days by priests and devotees, abound in southwestern China — a fact little known even to the Chinese themselves; most of them are natural grottoes, more or less modified for their purpose, and not all can be regarded as Buddhistic. The latest explorer of them is Vicomte D'Ollone, who speaks as follows of them, as seen in the mountains near the head of the Blue River (Yangtze) in his book 'In Forbidden China:' "Sometimes a population of statues slumbers and dreams in the mystery of these caverns, and the visitor experiences a feeling of religious awe as the torchlight shows their forms emerging from the shadow, like the very spirits of the earth."

A new and different impulse toward the utilizing of natural caves, and the construction of underground places of worship was given by the advent of Christianity and the consequent persecution of its early followers by the Romans, who regarded the sect not only as heretical but as politically dangerous. The faithful victims of this persecution were therefore compelled to seek everywhere secret places for their meetings. Their doctrine of the resurrection of the body, which was new in Rome, required that attention be paid to its proper bestowal after death, and this led, as long before it had done in Egypt, to elaborate tombs. Hence those sacred rock-cut tombs still revered in Palestine; and hence also the vast catacombs (q.v.) in the suburbs of Rome and of many other Italian cities. Within these catacombs were not only funereal chapels but regular churches. The system of hermitage, which became so prevalent in the early centuries of our era throughout North Africa and Asia Minor, sanctified many caves and semi-grottoes once inhabited by anchorites, and led to regular worship in them. Says Dean Stanley 'Sinai and Palestine' (London 1856): "The moment that the religion of Palestine fell into the hands of Europeans it is hardly too much to say that as far as sacred traditions are concerned it became a religion of caves.

Wherever a sacred association had to be fixed, a cave was immediately selected or found as its home."

In Europe the veneration of the martyrs became in the Middle Ages the leading principle of Christian worship; and in many places the earth or rock about their tombs was removed until the sarcophagus was exposed, and then a chapel, wholly or partially subterranean, was built about it. The crypts of ancient churches owe their origin to this custom, and many old cathedrals and churches in Europe rest on such sites.

All these influences resulted in the hewing of early and mediæval churches out of the *massif* of cliffs and hillsides. Egypt has several rock-hewn temples of this kind; and they occur in Palestine, Crete, Spain, France, England and elsewhere. How elaborate many of them are may be illustrated by a single example, that of Saint Emilion, in the valley of the Dordogne River, France, where, in the middle of the 8th century, a hermit named Emilian lived in a small cave, still to be seen. He became celebrated as a teacher, and finally a monastery and gradually a town grew up in the valley below. Beside the town rises an abrupt mass of rock, hollowed out into a stately church. Its ground-plan measures 120 by 60 feet. The front contains a vestibule, 21 feet high, with doors and windows pierced in the face of the rock. The three lower windows are of the flamboyant order, the upper three (clearstory) are round; the principal doorway through the rock-wall is richly sculptured. The body of the church stands parallel with the face of the cliff, and is 95 feet long and 60 feet high. It consists of a nave and side-aisles, all excavated out of the living rock, the pillars left square, the ceiling accurately vaulted, and the whole dimly lighted by the vestibule windows. The pillars are plain, and without capitals, but quaint large figures are carved on the walls and at the rear of the choir.

Coincident with these mediæval churches several famous monasteries began as cave-hermitages, and were enlarged into series of halls and cells cut out of solid rock. These were in some cases occupied for hundreds of years, supplemented by, or giving place to, buildings erected near them. Examples of such cave-monasteries of old times are to be found even in England.

Bibliography.— The most complete summary of information relating to modern cave-dwellers is to be found in Baring-Gould's 'Cliff-Castles and Cave-Dwellings of Europe' (Philadelphia 1911); for local particulars elsewhere, consult geographical treatises, such as the 'Universal Geography' of Reclus; books by explorers and travelers; the publications of archæological institutes; scientific periodicals, and local histories — mostly in foreign languages.

ERNEST INGERSOLL.

CAVE MEN, are literally men who have occupied, or do occupy, caves as residences. In popular use the term most often refers to the prehistoric time, when primitive men dwelt in the shelter of overhanging rocks and cavern roofs, because they had not yet learned how to build houses. This is the fact in a certain early stage of primitive culture; and it will be found treated in its proper historic place in the article STONE AGE. For the human occupation of caves for residence and various other purposes within historic times see CAVE DWELLERS.

CAVE-TEMPLE, a cave used as a temple; but the name is especially applied to temples excavated in the solid rock, such as exist in considerable numbers in India.

CAVEAT, kā'vē-ăt (Lat. "let him beware"), in law, a notice served on a public officer or court to refrain from doing a certain act without first giving notice to the caveator, as the person is termed who enters the caveat. Perhaps the best known use of the caveat in the United States is its entry by an inventor in the Patent Office for the purpose of establishing his claim to priority of invention, by enjoining its officers from issuing letters patent for any invention interfering with or infringing the rights claimed by the caveator without first giving him notice of the application for such letters patent. The terms of the caveat must set forth the claims of the inventor and the details of his invention with sufficient particularity to enable the officials of the Patent Office to determine whether a subsequent application for letters falls within the claims of the first inventor. If such is the case the caveator is entitled to notice of such interfering application, and the new applicant's claim to letters is suspended for three months, during which period the caveator must complete his specifications and file his own application for letters patent. If no interfering application is filed, the caveator's rights remain valid for one year, and may be renewed at the end of that term, for one year more, on payment of a second fee. The law providing for the filing of caveats was repealed by Congress in 1910. Other uses of the caveat are to prohibit (without notice to the caveator) the admission of a will to probate, the enrolment of a decree in chancery, the grant of letters testamentary to an executor, the issuing of a commission *de lunatico inquirendo*, etc. On the filing of such a caveat and due notice being served thereunder, a hearing is had before a competent tribunal for the determination of the rights in the matter. (See PATENTS). Consult 'Rules of United States Patent Office'; Merwin, 'Patentability of Inventions' (Boston 1883); Luby, 'Patent Office Practice' (Kalamazoo 1897).

CAVEAT, kā'vē-ăt, EMPTOR (Lat. "let the buyer beware"), a rule of law that warns the purchaser to take care and examine properly before he buys it. In sales of real estate the purchaser's right to relief depends on the covenants in the deed in the absence of fraud on the part of the vendor. In 1 Serg. & R. 42, the rule is stated as follows:

> "The rule of *caveat emptor* strictly applies to the purchase of lands, and the consideration-money cannot be recovered back after a deed executed, unless in case of fraud, where some covenant inserted in the deed has been broken. The purchaser has it in his power to protect himself by proper covenants, and there is no reason why the law should provide to him a remedy, where he himself has been wholly inattentive and negligent in this particular."

In sales of personal property the purchaser buys at his own risk, in the absence of an express warranty by the seller, or when the law does not imply a warranty from the circumstances of the sale or the nature of the thing

sold, and when the seller was not guilty of a fraudulent misrepresentation or concealment. The purchaser must examine the quality of the goods bought and rely upon his own judgment. Generally, if the article purchased is defective, and an examination, such as a reasonable and prudent man would make, would enable him to see the defect, it is not a fraud on the part of the seller not to call his attention to it.

At common law in the city of London, the law of market overt applied to all stores where articles in that particular line were sold. The purchaser got a good title, but as to the quality the purchaser must examine and judge for himself.

CAVEDONE, kä-vĕ-dō'nā, **Jacopo,** Italian painter: b. Sassuolo, in the duchy of Modena, 1577; d. Bologna 1660. He was a pupil of Annibale Carracci. His best works are the 'Saint Alo,' for the church of the Mendicanti at Bologna, the 'Adoration of the Magi,' the 'Four Doctors,' and the 'Last Supper,' which are now in the Bolognese Academy. Out of Italy he is frequently mistaken for Annibale Carracci. He became an assistant to Guido Reni in Rome. In his declining years he fell into great neglect and died in extreme poverty.

CAVELL, Edith, an English nurse: b. Norfolk 1872; executed in Brussels during the German occupation of Belgium on 12 Oct. 1915. She was the daughter of a clergyman; entered London Hospital for training as nurse, 1896; invited to Belgium in 1900 by Dr. Depage, a distinguished medical man who had established a training school for Belgian nurses in a suburb of Brussels, and desired to modernize the nursing system of the country. Belgian nurses up to that time had been recruited chiefly from the ranks of nuns and domestic servants — the former attending mainly to Catholics and the latter to non-Catholic patients. Miss Cavell accepted the invitation and threw herself whole-heartedly into the task. In 1906 she became head of the institution, from which developed a large nursing organization throughout Belgium. At the outbreak of the European War in 1914, she was in England on a visit, but returned at once to Belgium and converted her institute into a hospital for wounded soldiers. Dr. Depage was called into military service and placed in charge of another Belgian hospital, while Miss Cavell continued her work in Brussels. During the German occupation of the city — from 20 Aug. 1914 — she was permitted to remain in control of the hospital. For the first year of the war she nursed without discrimination Belgians, French, British and Germans. During this time, with the aid of friends in Brussels, she was instrumental in conveying many of the wounded Allied soldiers — upon their recovery — across the frontier into Holland, whence they were able to rejoin their armies. She also assisted Belgians of military age to escape capture by the Germans. Her activities were discovered by the German authorities through the agency of a Belgian traitor (who was found murdered in the street nearly a year later), and on 5 Aug. 1915 she was arrested and lodged in the military prison of Saint Gilles. She was kept in solitary confinement for three weeks before the fact of her arrest became known. At the request of the British government the American Minister at Brussels, Mr. Brand Whitlock, took up the case and addressed an inquiry (31 Aug. 1915) to Baron von der Lancken, the chief of the political department of the German military government in Belgium. No reply being forthcoming for 10 days, Mr. Whitlock wrote again and was informed (12 September) that Miss Cavell's defense was in the hands of a Belgian advocate, and that no interview could be permitted. The legal adviser to the American legation, M. de Leval, then endeavored to communicate with the prisoner and her alleged advocates, but in vain. On 4 October he was informed that the trial would be held on the 7th — nine weeks after the arrest. The defence was kept in the dark as regards documentary evidence in possession of the prosecution. By frankly admitting the charge brought against her, Miss Cavell had given the prosecution evidence that would otherwise have been unobtainable. According to the German Military Code the offense was treason and punishable by death. The trial ended on the following day (8 October) and judgment was reserved. The officials of the American legation made the most strenuous efforts to obtain information regarding Miss Cavell's fate; at 6.20 P.M. on the 11th, Mr. Hugh Gibson, the secretary, was officially informed that the decision had not yet been given. At 8 P.M. M. de Leval heard by accident that sentence of death had been passed at 5 P.M., and that Miss Cavell was to be shot at 2 in the following morning. Mr. Brand Whitlock was ill in bed at the time, but he wrote a personal letter to von Bissing, the military governor, while Mr. Gibson, M. de Leval and the Spanish Ambassador formed a deputation of appeal for mercy or at least postponement of sentence. They were dismissed about midnight and two hours later Edith Cavell fearlessly faced the firing squad. During an interview with a British chaplain she remarked, "I have seen death so often that it is not strange or fearful to me." Consult Gibson, H., 'A Journal from our Legation in Belgium' (New York 1917).

HENRI F. KLEIN.

CAVEN, William, Canadian educator: b. Kirkcolm, Wightonshire, Scotland, 26 Dec. 1830; d. Toronto, 1 Dec. 1904. In 1847 he emigrated with his parents to Canada, where they settled in Dumfries township, near Galt. After teaching school, he entered at 17 the theological seminary of the United Presbyterian Church at London, Ontario, was licensed to preach in 1852 and held a charge at Saint Mary's until 1866, when he was called to the chair of Old and New Testament Literature in Knox College, Toronto. In 1873 he succeeded Dr. Willis as principal of the college, and held that office until his death. He was largely instrumental in raising the funds for its new buildings, and contributed greatly toward the union, happily finally completed in 1875, of the various Presbyterian bodies of Canada, in which year he was moderator of the united church, and again in 1892. By his wise foresight, statesman-like grasp of affairs and moderating and healing counsels, he rendered service of inestimable value in the consolidation and upbuilding of the Presbyterian Church in Canada. From

1900 to 1904 he was president of the Pan-Presbyterian Alliance.

CAVENDISH, kăv'ĕn-dĭsh or kăn'dĭsh, **Frederich Charles,** LORD, second son of the 7th Duke of Devonshire, English statesman: b. Eastbourne, 30 Nov. 1836; d. 6 May 1882. He was graduated from Cambridge in 1858, was private secretary to Lord Granville from 1859 to 1864. He sat in Parliament as Liberal member for the north division of the West Riding of Yorkshire from 1865 till the spring of 1882 and after serving as private secretary to Mr. Gladstone and acting as financial secretary (1880–82), he succeeded Mr. Forster as chief secretary for Ireland. He accompanied Earl Spencer to Dublin, and on the evening of 6 May, he and Mr. Burke an unpopular subordinate, were stabbed to death in the Phœnix Park. Eight months later, 20 "Irish Invincibles" were tried for the murder, and, Carey and two others having turned Queen's evidence, five of the rest were hanged, three sentenced to penal servitude for life and the remaining nine to various terms of imprisonment. Carey himself disappeared; but in July news came from the Cape that he had been shot dead by an Irishman named O'Donnell on board an emigrant ship. O'Donnell was taken back to London and hanged.

CAVENDISH, George, English biographer: b. about 1500; d. about 1561. He became Wolsey's gentleman-usher at least as early as 1527. He remained in close attendance upon his great master till the latter's death, 28 Nov. 1530, after which he retired to his house at Glemsford, in Suffolk, where he lived quietly with his wife, a niece of Sir Thomas More, till the close of his own life. His affection for the great cardinal was most devoted, and his 'Life of Cardinal Wolsey' is one of the most interesting short biographies in the English language. It was written in 1557 and published in an unsatisfactory state in 1641, but it was not until 1905 that it appeared in polished form.

CAVENDISH, Henry, English chemist: b. Nice, Italy, 10 Oct. 1731; d. London, 10 March 1810. He was a grandson of the 2d Duke of Devonshire, and after his education at Peterhouse College, Cambridge, devoted himself exclusively to scientific research. He lived in quiet retirement, having no interests besides his scientific studies. He never married, and left a fortune of £1,175,000. He was rather eccentric, and had a hesitation in his speech. His first researches dealt with arsenic, and in 1765 he made some notable investigations concerning heats of liquefaction and vaporization which were not published until considerably later. He discovered the peculiar properties of hydrogen, and the qualities by which it is distinguished from atmospheric air. To him we owe the important discovery of the composition of water. Scheele had already observed that, when oxygen is mixed with double the quantity of hydrogen, this mixture burns with an explosion without any visible residuum. Cavendish repeated this experiment with the accuracy for which he was distinguished. He confined both the gases in dry earthen vessels, to prevent the escape of the product of their combustion, and found that this residuum was water, the weight of which was equal to the sum of the weights of the two gases. Lavoisier confirmed this conclusion in later times. Cavendish also obtained the anhydride of nitrous acid from nitrogen and oxygen by the electric spark.

Cavendish determined to constant K in the law of gravitation $f=\frac{Kmm^1}{d^2}$, where m and m^1 are the masses of two bodies, d the distance between them and f the measure of their mutual gravitational attraction, and was thus able to determine the mean density of the earth. He found it to be 5.45 times as great as the density of water — a conclusion which differs but little from that obtained by Maskelyne in another way. The apparatus used consisted of two large fixed masses of lead and two smaller masses near these at the ends of a rod suspended by a wire at its middle. It was devised by the Rev. John Mitchell. Cavendish was a member of the Royal Society of London, and in 1803 was made one of the eight foreign members of the National Institute of France. His writings consist of treatises in the 'Philosophical Transactions,' from 1766 to 1792. They are distinguished by acuteness and accuracy. Consult 'The Electrical Researches of Henry Cavendish,' edited by J. Clerk-Maxwell (Cambridge 1879); Wilson, 'Life of Cavendish' (London 1846).

CAVENDISH, Margaret, DUCHESS OF NEWCASTLE, English writer: b. Essex 1624 (?); d. London 1674. She became a maid of honor to Queen Henrietta Maria (1643–45). She married William Cavendish, afterward Duke of Newcastle (1645), and lived abroad with him until the Restoration. She was buried in Westminster Abbey. She wrote 'Philosophical Fancies'; a collection of poems, 'The Pastime and Recreation of the Queen of Fairies'; 'Philosophical Letters' (1664); an 'Autobiography'; and a 'Memoir' of her husband. Selections of her works have been edited by Lower (in Smith's 'Library of Old Authors,' (London 1872); by Jenkins (London 1872); by C. H. Firth (London 1886). Consult Gosse, E., 'Seventeenth Century Studies' (London 1895).

CAVENDISH, or **CANDISH, SIR Thomas,** English navigator: b. Trimley Saint Martin, Suffolk, about 1555; d. at sea off Ascension Island 1592. Having consumed his property by his early extravagances, he collected three small vessels for the purpose of making a predatory voyage to the Spanish colonies. He sailed from Plymouth in 1586, took and destroyed many vessels, ravaged the coasts of Chile, Peru and New Spain and returned by the Cape of Good Hope, having circumnavigated the globe in two years and 49 days, the shortest period in which it had then been effected. For this exploit he was knighted by the Queen. In 1591 he set sail on a similar expedition, in which his principal success was the capture of the town of Santos, in Brazil. Accounts of his voyages are to be found in Hakluyt.

CAVENDISH, William, Duke of Newcastle, English general: b. 1592; d. 25 Dec. 1676. James I made him knight of the Bath in 1610 and in 1620 raised him to the peerage as Viscount Mansfield. In 1628 he became Earl of Newcastle by Charles I and later became the tutor of Charles' son, afterwards Charles II. On the approach of hostilities between the

Crown and Parliament he embraced the royal cause, and was invested with a commission constituting him general of all His Majesty's forces raised north of the Trent, with very ample powers. Through great exertions, and the expenditure of large sums from his private fortune, he levied a considerable army, with which, for some time, he maintained the King's cause in the north. In military matters he depended chiefly on his principal officers, it is said, but the numerous successes obtained by him render this unlikely. In 1634 he obtained a complete victory over Lord Fairfax on Adwalton Moor, and recovered all Yorkshire except Hull; but next year on the arrival of the Scottish army and its junction with the Parliamentary forces, threw himself into York. Having been relieved by Prince Rupert, he was present at the battle of Marston Moor next day, after which he left the kingdom. His term of exile was chiefly spent in Antwerp, where he was for a long time so straitened in circumstances that he had on one occasion to pawn his wife's jewels. He returned after an absence of 18 years, and was rewarded for his services and sufferings with the dignity of Duke of Newcastle. His works include 'La methode et invention nouvelle de dresser les chevaux' (Antwerp 1657), 'A New Method and Extraordinary Invention to Dress Horses and Work Them According to Nature' (1667); some comedies of no merit, and several worthless poems. Consult 'Life of the Duke of Newcastle' by Margaret Lucas, his second wife (London 1886). Pepys ridicules this work in his 'Diary.'

CAVENDISH, William, English statesman: b. 25 Jan. 1640; d. 18 Aug. 1707. He was the son of William, 3d Earl of Devonshire, and 1st Duke of Devonshire. In 1677 began that opposition to the arbitrary measures of the ministers of Charles II which caused him to be regarded as one of the most determined friends of the liberties of his country. Intimately connected with Lord Russell, he joined him in his efforts for the security of free government and the Protestant religion. In 1684 he succeeded to his father's title. He took an active part in promoting the revolution, and was one of the first who declared for the Prince of Orange.

CAVENDISH, tobacco which has been softened and pressed into quadrangular cakes and often sweetened with syrup and molasses, for chewing, so called after Thomas Cavendish, the Elizabethan circumnavigator. It is also called negro-head.

CAVENDISH EXPERIMENT. See GRAVITATION.

CAVERYPAUK, India, a town of Hindustan, in the North Arcot division of Madras Presidency, 57 miles west-southwest of Madras. It is meanly built, and the adjoining fort, at one time a place of some strength, is now in ruins. A victory was gained here by the British under Clive over the French and their allies in 1752. Near the town is an immense artificial pond, eight miles long by three miles broad, by means of which a large tract of country is irrigated. It is perhaps the finest work of the kind in South India. Pop. 7,000.

CAVIANA, kä-vē-ä'nä, Brazil, an island 35 miles long and 20 miles wide. It lies in the north mouth of the Amazon, under the equator; is level, fertile and well stocked with cattle. The small town of Roberdello is on its southeastern side and is almost exactly under the equator.

CAVIARE, or CAVIAR, kä-vĭ-är', a table delicacy prepared from the roe of the sturgeon, especially in Russia. This is made in great quantities in Astrakhan, where the fish are caught in great numbers. Lately the industry has been extended in the western part of the United States. The process is as follows: The ovaries are first removed from the fish and beaten to loosen the eggs, which are then separated from the muscular tissues by being pressed through a sieve and washed in vinegar. Salt is rubbed in by hand, and the roe is put into a cloth and pressed to remove the liquor, after which it is packed in small kegs for market. The quality of the result depends on the care taken in clearing and drying it. The best is prepared by granulating the roe in linen sacks, which are laid in the brine and then hung up to dry in the sun.

CAVITE, kä-vē'tä, Philippines, province in the southwestern part of the island of Luzon, bounded on the north and northwest by Manila Bay, on the north and northeast by the province of Manila, and on the south by Batangas; area, 510 square miles, with the dependent islands, 610 square miles. In the south and southwest the province is mountainous; in the northwest there is a gradual elevation, forming a fertile plateau. The chief products are coffee, sugar, fruits and rice (in the lowland regions). In the towns of the interior, hemp and cotton cloth and sugar are manufactured; in the coast towns the chief industries are salt manufacture and fishing. There is export trade in all these products. There is communication with Manila by water and good roads throughout the province, connecting the coast with the interior. The occupation of Cavite by United States troops was the first event of importance in the Philippines after the naval battle in Manila Bay, 1 May 1898. The government of the province was established under the provincial government act of 6 Feb. 1901; and later several of the dependent islands were added to the territory in Luzon. Pop. 134,799.

CAVITE, Philippines, town and capital of the province of Cavite, on the eastern shore of Manila Bay. A tongue of land about one and a quarter miles long, projecting due east, separates waters of Cañacao Bay on the north and Bacoor Bay, inner harbor of Cavite, on the south. On this projection are situated fortifications and arsenal. During the Spanish administration Cavite was one of the principal strongholds in the archipelago, and since the Spanish-American War has been made even stronger. The town is walled, and all the buildings are of stone; it has a parochial church, two convents and a hospital. It has also several manufacturing industries, and is well equipped for building and repairing vessels. The Spanish fleet had its position off Cavite when attacked by Admiral Dewey on 1 May 1898. The town is the naval headquarters of the United States in the Philippines. Pop. 4,494.

CAVO RELIEVO, kā'vō-rē-lyā'vō, **Sculpture in**; called also **COELANAGLYPHIC** and **CONCAVO-CONVEX SCULPTURE**, a system of relief in which the figures do not rise above the general surface of the material on which the carving is done. It may be looked upon as sculpture in relief, of which the background has not been cleared away in the usual manner. Again, it may be considered as sculpture of which the bounding line has been marked by a groove, generally wedge-shaped, that is with a section like a V: the slope of one side being left as the boundary of the pattern or design, while the other slope disappears in the general rounding of the figures. This sculpture, in architectural art, is almost confined to the Egyptian buildings of times before the Roman domination; but in minor decorative arts the Orientals do beautiful work in this way.

CAVOUR, kä-voor', **Camillo Benso, Count di**, Italian statesman: b. Turin, 10 Aug. 1810; d. 6 June 1861. He was the son of the Marquis Benso di Cavour and his mother was the daughter of Count de Sellon of Geneva. He was educated in the military academy at Turin, where he was graduated in 1826 with highest standing in his class. He had shown special aptitude for mathematics, a love for history and great facility for languages. After completing his studies he made a journey to England, where he acquainted himself with the principles and working of the constitution. Finding military life uncongenial, he resigned his commission in 1831, and assumed the management of his father's estates at Leri (Piedmont), which he made one of the model agricultural properties of the country. In 1842 he returned to Turin, where shortly afterward he published in the 'Bibliothèque Universelle' of Geneva his 'Considerations on the Present State and Future Prospects of Ireland,' which were subsequently translated into English. With Count Balbo and others he established in 1847 the journal of the 'Risorgimento,' which he devoted to the same cause of reform, independence and national unity. It was not, however, till after the battle of Novara that he entered that political arena in which his name his since become so famous. He became a member of the Sardinian Chamber of Deputies in 1849, and the following year succeeded Santa Rosa as Minister of Commerce and Agriculture. In this office he set himself strenuously to promote the internal prosperity of the country by the establishment of railways and an improved system of postal communications. A new organization was given to the military and naval forces; and the monasteries were, with certain exceptions, suppressed.

His aggressive national policy made Cavour very prominent and, in November 1852 he became Premier, Minister of Finance and President of the Council and, not long afterward, gave a signal proof of his statesmanship by the part which he took in cementing an alliance with Great Britain and France, and making common cause with these powers against the aggressions of Russia. The prestige thus gained to the arms of Sardinia was no less important than that acquired by her liberal and reforming policy in civil matters. The attitude, however, thus taken by Sardinia could not fail to prove extremely offensive to the neighboring power of Austria to whose arbitrary and repressive measures the government of Victor Emmanuel displayed itself as a standing reproof, and whose supremacy in Italy was eminently jeopardized by the aspirations of Sardinia. A collision, therefore, was inevitable, resulting in the campaign of 1859. This had been foreseen by Cavour who had made a secret agreement with the French Emperor whereby France was to come to the aid of Italy in case of need (July 1858). The intimate connection formed at that time with France, who lent her powerful assistance in the prosecution of the war, was mainly due to the agency of Cavour, who was accused, on this occasion, of having purchased the assistance of Louis Napoleon by unduly countenancing his ambitious projects. Napoleon secretly signed a treaty of peace with Austria thus deserting Italy before the close of the war; and Cavour, broken-hearted, retired to private life; but he was recalled to the head of the government in 1860. On 11 Oct. 1860 he secured the passage of a bill by the Piedmontese Parliament authorizing the government to incorporate in one union such provinces of southern Italy as should express their desire therefor by a plebiscite. This had united all Italy, except Venetia and Rome, in 1861.

The marriage of Victor Emmanuel's daughter, the Princess Clotilde, with Prince Napoleon, was consummated in the early part of 1859, and the conclusion of the same year witnessed the cession of Nice and Savoy to France. In bringing about both of these results Cavour took a leading part. In 1860 Garibaldi's expedition to Sicily took place; but toward this and the subsequent movements of the Italian liberator, Count Cavour manifested an apparent coldness, which diminished somewhat his estimation in the minds of the more zealous Italian patriots. Consult Romilly, 'Reminiscences of the Life of Cavour' (1863); Dicey, 'Cavour: a Memoir'; Bianchi, 'La politique de Cavour' (1885); 'Lives' by Massari (1873); Mazade (1877); Martinengo-Cæsaresco (1897); Thayer, 'The Life and Times of Cavour' (Cambridge 1911); Orsini, 'Cavour and the Making of Modern Italy' (New York 1914).

CAVY, kā'vi, a small rodent of the family *Caviidæ*, related to the paca aud aguti, and characterized by its stout build, short legs, small ears, pink eyes, and total absence of a tail. Cavies feed upon roots and vegetable fare, and are widely distributed throughout the plains and unforested highlands of South America. The only domesticated and familiar species is the much modified guinea-pig (q.v.), which is about eight inches long, and owing to its harmlessness is a great household pet among children. The largest species of cavy (*Dolichotis patachonica*), wrongly called "agouti," is scantily distributed throughout the plains of Argentina. It is rusty red in color, and about the size of a hare, standing on terrier-like legs. The "restless" cavy (*C. porcellus*), and Cutler's cavy (*C. cutleri*), are common in the La Plata Valley, and are uniformly colored with grayish-brown or black. Other species are found in Brazil and Bolivia. Cavies of several species were abundant in the Miocene and Pleistocene

periods in South America, as is shown by numerous fossils; these extinct forms differed little from the modern cavies. Cavies live in burrows of their own digging, and breed twice a year, the number of young varying with the climate. The young are brought forth in a very advanced state of development. Their eyes are open and they are capable of running by the side of their mother in a few hours' time. In less than a fortnight they are quite able to care for themselves. Consult Hudson, 'Naturalist in La Plata'; and Lydekker, 'Royal Natural History.'

CAWDOR, kô'dẽr, Scotland, village in Nairnshire, five and one-half miles southwest of Nairn. Cawdor Castle, near by, the seat of the Earl of Cawdor, was founded in 1454, but is one of the three places which tradition has assigned as the scene of King Duncan's murder by Macbeth in 1040. A series of papers from the charter-room at Cawdor was edited (1859) by Cosmos Innes under the title of 'The Book of the Thanes of Cawdor.' Pop. 847.

CAWDOR, Thane of, in Shakespeare's 'Macbeth,' a character who does not appear upon the stage. On account of his alliance with the Northmen he is condemned to death by Duncan, who calls him "that most disloyal traitor." His title is given to Macbeth, in accordance with the prophecy of the witches. In describing his death it is thought that Shakespeare had reference to the execution of the Earl of Essex.

CAWEIN, kaw'ĕn, **Madison Julius,** American poet: b. Louisville, Ky., 23 March 1865; d. Louisville, Ky., 8 Dec. 1914. His verse is often exceedingly musical and displays great command of metres. Its defects are over-ornamentation, and a too profuse employment of adjectives, but the note which he strikes is distinctive and pleasing. He is at his best in his purely Kentuckian poems. His works include 'Blooms of the Berry' (1887); 'The Triumph of Music' (1888); 'Accolon of Gaul' (1889); 'Lyrics and Idyls' (1890); 'Days and Dreams' (1891); 'Moods and Memories' (1892); 'Intimations of the Beautiful' (1894); 'Poems of Nature and Love' (1893); 'Red Leaves and Roses' (1893); 'Undertones' (1895); 'The Garden of Dreams' (1896); 'Shapes and Shadows' (1898); 'Idyllic Monologues' (1898); 'Myth and Romance' (1899); 'One Day and Another' (1901); 'Weeds by the Wall' (1902); 'A Voice on the Wind' (1902); 'Kentucky Poems,' with introduction by Edmund Gosse (1902); 'The Vale of Temple' (1905); 'Nature-Notes and Impressions' (1906); 'Complete Poetical Works' (5 vols., 1907); 'An Ode in Commemoration of the Founding of the Massachusetts Bay Colony' (1908); 'New Poems' (1909); 'The Giant and the Star' (1909); 'The Shadow Garden and Other Plays' (1910); 'Poems,' with foreword by William Dean Howells (1911); 'The Republic' (1913); 'Minions of the Moon' (1913); 'The Poet and Nature and the Morning Road' (1914); 'The Cup of Comus' (1915).

CAWNPORE, kôn-pōr, or **CAWNPUR,** kôn-poor', India, capital city of the district of the same name, in the Northwest Provinces, on the right bank of the Ganges, which is here about a mile wide, 130 miles northwest from Allahabad. It is a modern town with nothing specially noteworthy about it as regards site or buildings. There are several churches, a theatre, various military and other offices, high school, club, etc. It manufactures leather and cotton goods, has a large trade and is an important railway centre. In 1857 the native regiments stationed here mutinied and marched off, placing themselves under the command of the Rajah of Bithur, the notorious Nana Sahib. General Wheeler, the commander of the European forces, defended his position for some days with great gallantry, but, pressed by famine and loss of men, was at length induced to surrender to the rebels on condition of his party being allowed to quit the place uninjured. This was agreed to; but after the European troops, with the women and children, had been embarked in boats on the Ganges, they were treacherously fired on by the rebels; many were killed, and the remainder conveyed back to the city, where the men were massacred and the women and children placed in confinement. The approach of General Havelock to Cawnpore aroused the brutal instincts of the Nana, and he ordered his prisoners to be slaughtered, and their bodies to be thrown into a well. The following day he was obliged, by the victorious progress of Havelock, to retreat to Bithur. A memorial has since been erected over the well in the form of an angel with palm branches, and fine public gardens, covering 50 acres, now surround the spot. Pop. 178,557. Consult Trevelyan, 'Cawnpore' (London 1865).

CAXAMARCA. See CAJAMARCA.

CAXIAS, kā-shē-ās', the name of two places in Brazil: (1) A town in the state of Maranhão, on the navigable Itapicuru, 190 miles from its mouth, with an active trade in cotton, cattle and rice, the river being navigable. It is the birthplace of the poet, Luis Gonçalvez Dias. Pop. 10,000. (2) An Italian agricultural colony in the Brazilian state of Rio Grande do Sul, founded in 1875. Pop. 13,680.

CAXTON, William, first English printer: b. Kent about 1422; d. London 1491. In 1438 he was bound apprentice to Robert Large, a mercer in London, and soon after his master's death (1441) he went to Bruges, where, in 1446, he went into business on his own account. About 1463 he was appointed "governor" at Bruges for the English merchants settled in the Low Countries, a post in which he continued for some years. About 1471 Caxton entered the service of Margaret, Duchess of Burgundy, sister of Edward IV. He had already begun a translation of the popular romance entitled 'Le recueil des histoires de Troye,' and this he finished at Cologne in 1471. In order to meet the demand for the book he learned the art of printing, probably at Cologne, and his 'Recuyell of the Histories of Troy,' the first English printed book, appeared about 1474, having issued, it is supposed, from the press of Colard Mansion at Bruges. His 'Game and Playe of the Chesse,' also a translation from the French, was probably a production of the same press in 1475, and is the second English book printed. He left Bruges in 1476, returned to England, and in 1477 had a press at Westminster Abbey, where he printed the 'Dictes and Sayings of the Phi-

losophers,' the first typographical work executed in England. Caxton continued to exercise his art for about 14 years, during which time he produced nearly 80 works, many of them translated by himself from the French, and one of them — 'Reynard the Fox'— from the Dutch. He was patronized by Edward IV, Richard III and Henry VII; and he was on intimate terms with Earl Rivers, the Earl of Worcester and others of the nobility, the two noblemen named having even translated works for his press. He was buried in the church of Saint Margaret's Westminster. Besides the books already mentioned, Caxton printed Chaucer's 'Canterbury Tales'; 'Troylus and Creside'; 'Book of Fame,' and translation of Boethius; Gower's 'Confessio Amantis'; works by Lydgate; Malory's 'King Arthur'; 'The Golden Legend'; 'The Fables of Æsop,' etc. His books have no title pages, but are frequently provided with prologues and colophons. His types are in the Gothic character, and copied so closely from the handwriting of his time that many of his books have been mistaken for manuscript. In some no punctuation is used; in others the full point and colon only; commas are represented by a long or short upright line. Copies of some of his books now bring extraordinary prices when sold. The standard 'Life of Caxton' is that by W. Blades (1861–63). Consult also Knight, 'The Old Printer and the Modern Press' (London 1861); Blades, 'A Catalogue of Books Printed by or Ascribed to William Caxton' (London 1865); 'Biography and Typography of Caxton' (London 1882); 'Cambridge History of English Literature' (Cambridge and New York 1907–13, in Vol. II); and the publications of the Caxton Club.

CAXTONS, The, a novel by Edward Bulwer, Lord Lytton, published in 1850 (3 vols., octavo). 'The Caxtons' was not only instantly popular in England, but 35,000 copies were sold in America within three years after its publication in 1850. Never before had Bulwer written with so light a touch and so gentle a humor, and this novel has been called the most brilliant and attractive of his productions. His gentle satire of certain phases of political life was founded, doubtless, on actual experience.

CAYAMBE-URCU, kā-yām-bā'-oor'koo, or **CAYAMBE,** a volcanic peak of the Colombian Andes, lying directly under the equator in Ecuador. It rises in the shape of a beautiful and regular cone to a height of 19,187 feet. Its top is crowned with perpetual snow, and its geographical position and great elevation render it one of the most remarkable mountains of the world.

CAYENNE, kā-yĕn' or kī-ĕn', French Guiana, a city and capital of the colony, situated in lat. 4° 56′ N., long. 52° 20′ W. Six French expeditions were sent out to Cayenne and other parts of Guiana between 1604 and 1652. The Dutch occupied it in 1654, but were obliged to surrender possession to a new French expedition. After the Treaty of Breda in 1667 the Dutch once more took Cayenne, and were attacked there by the French in 1676. The French settlement was permanently established at the beginning of the 18th century. It was until within recent years a French penal settlement. The climate of the capital, which is built on an island east of the mouth of the Cayenne River, is rendered exceedingly unwholesome by the low and swampy character of a part of the neighboring coast. The harbor is shallow, yet the products of the country — gold, sugar, molasses, rum, coffee, hides, spices, cocoa, etc.— are shipped in considerable quantities each year. Pop. (1911) 13,527. See GUIANA.

CAYENNE PEPPER. See CAPSICUM.

CAYES, kā, **Les.** See AUX CAYES.

CAYEY, ki-a', P. R., town 35 miles south of San Juan, 2,300 feet above sea-level. It is a favorite summer resort owing to its cool climate and excellent sanitation. It contains old barracks dating from the Spanish colonial period, a hospital, church and schools. Tobacco growing and allied industries, including the manufacture of cigars, are its principal industries. The grade of tobacco grown in the neighborhood is the best in Porto Rico. Pop. 5,000.

CAYLEY, kā'lĭ, **Arthur,** English mathematician: b. Richmond, Surrey, 16 Aug. 1821; d. London, 26 Jan. 1895. He received his early education at Blackheath and King's College, London, passing subsequently to Trinity College, Cambridge. Called to the bar in 1849, he practised for some years as a conveyancer, but in 1863 was appointed first Sadlerian professor of pure mathematics at Cambridge. Trinity College in 1875 accorded him the rare honor of electing him a foundation fellow. He received many distinctions from universities and learned societies both at home and abroad, and in 1883 he presided over the meeting of the British Association at Southport. He seldom identified himself with movements outside his own immediate work, but took a prominent part in the agitation for the higher education of women, which resulted in the foundation of Newnham College. As a mathematician he was characterized by the wide scope and originality of his work. His chief memoirs deal with differential equations, elliptic functions and determinants. He discovered the higher curve named for him, and the principal proposition of matrices known as Cayley's Theorem. His 'Elementary Treatise on Elliptic Functions' appeared in 1876, and 'Single and Double Theta functions' in 1881; and in 1889, a collected edition of his papers began to be issued, extending over 13 volumes. Numerous memoirs were published in the Cambridge *Mathematical Journal.* In 1882 he lectured in Johns Hopkins University, Baltimore.

CAYLUS, kā-lüs, **Anne Claude Philippe de Tubiêres,** COUNT OF, French archæologist: b. Paris, 31 Oct. 1692; d. there, 5 Sept. 1765. He was a son of the Marquise de Caylus (q.v.), and after having served in the army during the war of the Spanish succession, he left the service in 1715; accompanied Bonac on his embassy to Constantinople the following year, and visited Greece, Troy, Ephesus, Byzantium and Adrianople. In 1717 he returned to Paris, and began the arrangement of his extensive collections. He commenced a great work on Egyptian, Grecian, Etruscan, Roman and Gallic antiquities, with numerous plates. He was a member of the Academy of Painting and of the Academy of Inscriptions, and divided his labors between them. He made a chemical examina-

tion of the ancient method of encaustic painting, investigated the mode of painting on marble, the art of hardening copper, the mode by which the Egyptians raised great weights, the mummies, painting on wax and many other subjects. Integrity, simplicity and disinterestedness were united in his character, with occasional traits of dogmatism. He has left numerous works, tales as well as antiquarian researches. Among the latter is his 'Recueil d'antiquités égyptiennes' (1752-67, 7 vols.). Caylus was also an industrious and skilful engraver, and produced a collection of more than 200 engravings, after drawings in the royal cabinet, and a great number of heads, after the first masters. On this subject he wrote 'Nouveaux sujets de peinture et de sculpture' (1755) and 'Tableaux tirés de l'Iliade, de l'Odysée et de l'Enéide' (1757). His stories were collected under the title of 'Œuvres badines complètes' (Amsterdam 1787). A number of these were translated into English under the title 'Oriental Tales' in Gueulette's 'Chinese Tales' (1817). Consult Rocheblave, 'Essai sur le comte de Caylus' (Paris 1889); Nisard's ed. of the 'Correspondance du comte de Caylus avec le père Paciaudi' (1877); "Notice" of Uzanne in his 'Facéties' (1879).

CAYLUS, Marthe Marguerite de Villette, MARQUISE DE, French writer of memoirs: b. Poitou 1673; d. Paris (?), 15 April 1729. Originally of the Protestant family of D'Aubigné, she was converted to the Roman Catholic faith by her aunt, Madame Maintenon. Long an ornament of the brilliant court of Louis XIV, she passed her declining years in dictating 'My Recollections,' in which a valuable insight into the life of Louis XIV is afforded, through the medium of a singularly happy style. The work was edited first by Voltaire (1770) and by Racine (1881). Racine addressed the prologue to his tragedy of 'Esther' to her.

CAYMAN, kā-măn, or **CAIMAN,** kā-ē'-măn, any of the five species of alligators inhabiting the fresh waters of Central and South America. The caymans are distinguished from other alligators in having an armor of overlapping bony scutes protecting the belly, as well as an armor of bony plates on the back. The black cayman (*Caiman niger*) of tropical South America east of the Andes is the largest species, reaching a length of 13 feet. In some of the rivers of South America caymans are found in vast numbers and are said to be extremely voracious. Their habits are the same as those of the common alligator (q.v.). See JACARÉ.

CAYMAN ISLANDS, a group of three islands in the Caribbean Sea attached to Jamaica. They consist of: (1) GRAND CAYMAN, which is 17 miles long and 4 to 7 miles broad. Pop. 1911, 4,128. Its capital is Georgetown; pop. 1911, 1,446. (2) LITTLE CAYMAN, 9 miles long and 1¼ miles broad; pop. 1911, 136. (3) CAYMAN BRAC, 10 miles long and 1¼ miles broad; pop. 1911, 1,300. Education in the islands is backward, the annual expenditure being very small. They export green turtle, turtle shell, hides, cattle, ponies, cocoanuts. The climate is very healthful. A large proportion of the inhabitants are white. The government is administered by a commissioner and 14 justices of the peace appointed by the governor of Jamaica.

CAYUGA, kā-yoo'gă, **LAKE,** a lake in the State of New York, on the boundary of Cayuga and Seneca counties, and extending south into Tompkins County, 38 miles long and from 1 to 3½ miles wide. It is 381 feet above tidewater. It empties into Lake Ontario through the Seneca and Oswego rivers. At the north end the lake is shallow, but in other places it reaches a depth of 400 feet. It is navigable for 30 miles. It is much frequented by pleasure parties. The city of Ithaca stands at the southern extremity of the lake. Aurora is situated near the middle of the shore and Cayuga near the north end. It is connected by a canal with Seneca Lake.

CAYUGAS ("swamp-dwellers," possibly in reference to their cranberry swamps) a tribe of North American Indians, forming the smallest of the original Five Nations of the Iroquois, and according to Onondaga tradition, the last to join the confederacy; whence it was called "The Youngest Brother." The tribe was not inferior in energy and original genius, however; several of the chiefs were men of superior ability, as Karistagea, or Steeltrap; and Tahgahjute, or "Logan," the son of one of its sachems. The latter will be ever remembered, not only for the pathetic speech attributed to him, but for his high personal qualities. Nor were the Cayugas inferior in fighting prowess; in one of their Virginia campaigns they seem to have destroyed the tribe of Tuteloes, and incorporated with their own tribe the remnant who were not slain. They were friendly to the whites, however, and bore a good reputation. They were located along the Cayuga Lake in central New York, and in the valley of its outlet, the Seneca River. At the outbreak of the Revolution, they joined the Mohawks and Senecas in alliance with the British against the Americans, and shared in the devastation of the property of the patriots during Sullivan's campaign; the most of them settled in Canada with the other Iroquois, 200 remaining in New York, apparently around Niagara. In 1789 they made their first formal cession of territory to the whites, confirming it by a treaty at Fort Stanwix in 1790; in 1795, by a treaty at Cayuga Bridge, they ceded their great reserve in the lake basin and the river valley, retaining only one of four miles square. For these releases they received large money annuities, which they used largely for liquor. In 1806 all the remainder left the reservation and emigrated westward or northward; some joining their brethren in Canada, some going to Sandusky, Ohio, others settling among the Senecas near Buffalo. There are at present about 1,300 in all, the bulk of them at the Six Nations on Grand River, Ontario, some with the Oneidas in Wisconsin, about 170 with the Senecas in New York State and others with the Senecas in Indian Territory.

CAYUSE, kā-yoos', **CAILLOUX,** or **WILLETPOO,** a tribe of North American Indians who formerly inhabited the region between the Des Chutes River and the Blue Mountains, Oregon, and also parts of Washington, south of the Yakima River. In 1847, their number was greatly depleted by a smallpox epidemic. This resulted in a massacre of the Waültpu missionaries who were thought by the Indians to have introduced the disease. They now number some 300, mostly of impure

extraction, from intermarriage with other races. Their language, which is of Waülatpuan stock, is spoken by a very few of their number. The pony of the northwest United States takes its name from these Indians, who were doubtless responsible for its introduction among the tribes of that section.

CAYVAN, Georgia, American actress: b. Bath, Me., 1858; d. 19 Nov. 1906. She went on the stage early in life and won note as Dolly Dutton in 'Hazel Kirke.' She was afterward with A. M. Palmer and Daniel Frohman. She became leading lady of the Lyceum Theatre Stock Company in 1897, retiring from the stage soon afterward. Consult Clapp and Edgett, 'Players of the Present' (Dunlap Society, New York 1899); and Edmunds, 'Famous American Actors of To-Day' (edited by McKay and Wingate, New York 1896).

CAYZER, Sir Charles William (Charles Whitworth Wynne), English shipowner and poet: b. Bombay, 19 July 1869. He was educated at Rugby and Christ Church, Oxford, where he received the degree of M.A. He became partner in the firm of Cayzer, Irvine and Company, and director of the Clan Line Steamers. He retired in 1911. He has published 'Ad Astra' (1900), a very extensively advertised volume; 'Songs and Lyrics' (1900); 'King David' (1902); 'Undine' (1908); 'By the Way of the Gate' (1911); 'Donna Marina' (1905).

CAZAL, Manoel Ayres de, kä-zäl', Portuguese historian: b. 1754; d. about 1821. He was for a long period prior at Crato, Goyaz, Brazil, devoting himself to historical and geographical research, publishing in 1817 'Corographia Brazílica, ou relação histórico-geográfica do reino do Brazil' (2 vols., Rio de Janeiro 1817; 2d ed., 1845). It was prepared under the auspices of King John VI, and is distinguished for its exactitude, and is the first circumstantial report on the interior provinces of South America. The name of the author appears on the title page as Um Presbytero secular de grão Priorado do Crato. The work earned him the title of "Father of Brazilian Geography." Consult Pereira da Silva, 'Plubarco Brazileiro' (1847).

CAZALES, kä-zä'läs, **Jacques Antoine Marie de,** French politician: b. Grenade, Haute-Garonne, France, 1 Feb. 1758; d. Engalin, Gers, France, 24 Nov. 1805. The son of a counsellor of the Toulouse Parliament, he served for some time in Jarnac's regiment of dragoons. Being chosen in 1789 a deputy of the noblesse to the States-General, he became one of the most able and eloquent opponents of the Revolution, but was treated with ingratitude by the Royalists, although he had labored and suffered much in their cause, and barely escaped being put to death. Having traveled abroad during the reign of terror, he returned to France in 1803. Napoleon conferred on him, although he had refused to enter his service, the cross of the Legion of Honor. His 'Discours et opinions' and his 'Défense de Louis XVI' were published in 1821. Consult Chare's introduction to his 'Discours'; and Aulard, 'Les Orateurs de la Constituante' (2d ed., 1905).

CAZALLA DE LA SIERRA, kä-thäl'yä, Spain, a town in the province of Seville, and 53 miles by rail northeast of the city of Seville, on a declivity of the Sierra Morena. Its streets are clean, paved and well arranged; and it has two squares, in the principal of which are the ancient church and town-hall. The mountains in the vicinity are rich in metals. Pop. 8,044.

CAZEMBE, ka-zĕm'bĕ, **KAZEMBE,** or **CAZEMBE'S DOMINION,** Africa, a region formerly constituting a large and well-ordered negro state lying south and southwest of Lake Tanganyika, and taking its name from the title of the sovereign. The country forms a kind of basin, bounded on the east by a plateau which rises to the height of from 3,000 to 4,000 feet; on the west, also, it is bounded by a series of heights. On the south it has the lofty watershed which separates its streams from those of the Zambesi River system. Its principal stream is the Chambezi, which flows westward into Lake Bangweolo, then northward, under the name of the Luapula, into Lake Moero. The ruler, or muata, used to be feared as a great magician; he had over 600 wives, and maintained a well-armed body of troops, numbering at one time, it is said, 20,000. His dominions were divided into districts, each of which had a governor of its own. These governors and other men of rank formed a body of privileged nobility; all the rest of the inhabitants, farmers, artisans, etc., were looked upon as slaves of the ruler. The population consisted of a ruling race, the Campololos, who had invaded and conquered the country, and the Messiras, the original inhabitants. It was only Campololos that received official posts, and the Campololo language was the one spoken at court. The people were industrious agriculturists, growing crops of mandioc, maize, sorghum, etc. They manufactured coarse cloths, cords, nets, lines, etc., from cotton and the fibres of certain plants; made weapons and implements of iron; also earthenware, wooden vessels, etc. Cazembe was visited by Lacerda in 1799, and by other Portuguese explorers in 1831. Dr. Livingstone, in 1867, stayed 40 days at the capital, which he found to consist of a number of huts dotted over a large area, and having probably not more than a thousand inhabitants. The Cazembe at this time was a usurper, whose cruelties had done much to depopulate the country, and it was doubtful if he could bring a thousand warriors into the field. The British half of the country is now included in Rhodesia, and Cazembe is its chief town. Consult 'The Lands of the Cazembe' published by the Royal Geographical Society (1873).

CAZIN, kä-zăn', **Jean Charles,** French artist: b. Samer, Pas-de-Calais, 1841; d. 1901. He studied under Le Coq de Boibaudran. In 1868 he was appointed director of the Ecole des Beaux Arts and conservator of the museum at Tours. He went to England in 1871 where he devoted himself to designing ceramics for the Fulham pottery. It was not until 1876 that he exhibited pictures. At this time his 'Le Chantier' appeared, which was generously received. Next came the 'Fuite en Égypte' (1877); 'Le voyage de Tobie' (1878); 'Le départ'; 'L'Art,' for which he received honorable mention. By far the best of his works is the 'Agar et Ismaël,' in which he proved himself a master of the landscape-religious picture. For 'La Terre,' an Adam and Eve

theme, he obtained a medal of the first class. Other works are 'Souvenir de fête'; 'Poste de secours'; 'Judith' (1883); and 'La Journée faite,' in which he departs from the religious theme to portray a scene of contemporary reality. He is well known as a landscape painter. His figures are always subservient to the scene. But he has a power of idealization which gives to truth the most delicate air of poetry, a tender melancholy and charm. A wistful, hushed, sympathetic note pervades his works. He attempted to revive the art of encaustic painting. He became a member of the Legion of Honor. He also completed the decorations on the Puvis de Chavannes in the Pantheon (1898). Consult his biography by Bénédite (Paris 1901); and Marcel, 'La Peinture française au XIXe siècle' (Paris 1905).

CAZORLA, kä-thôr'lä, Spain, a town in Andalusia and 41 miles east of the city of Jaen. It rises in the form of an amphitheatre on the slope of the Sierra de Cazorla, and is well built, though much less important and populous than in the time of the Moors, during whose wars it held an important position. It has two castles, both in good preservation. The Sierra de Cazorla is a wooded ridge round which winds the upper course of the Guadalquivir. Pop. 7,936.

CAZOT, kä-zō', **Théodore Joseph Jacques**, French politician: b. Alais, 11 Feb. 1821; d. 1912. In 1848 he was active as a Republican in his home department; in 1870 he was appointed general secretary in the ministry of the interior; in 1871 elected to the National Assembly; and in 1875 was made life senator. From 1879–82 he was Minister of Justice and was interested in bringing about a reform in the appointment of judges, but retired without passing the law he desired. In this capacity he was also active in the persecution of the Jesuits and other unauthorized assemblies. In 1883 he was president of the Court of Cassation, resigning in 1884 on account of being implicated in fraudulent dealings.

CAZOTTE, kä-zŏt, **Jacques**, French poet: b. Dijon 1720; d. 25 Sept. 1792. His masterpieces are 'Ollivier' (1762), a poem of chivalry after the manner of Ariosto; and 'The Devil in Love' (1772), a tale of wonder, still a popular favorite. He had extraordinary skill in versifying, as shown by his adding a seventh canto to Voltaire's 'Civil War of Geneva' with such perfect imitation of Voltaire's style and manner as to deceive all Paris. He joined the 'Illuminati' about 1775. For his opposition to the Revolution as a Royalist he was guillotined by the Revolutionary Tribunal. Consult De Nerval, 'Illuminés' (Paris 1852).

CAZWINI, käz-wē'nē, **Zacharia Ben Mohammed**, Arabian naturalist: b. Cazwin, Persia, 1212; d. 7 April 1283. He was descended from a family of lawyers, who derived their origin from Anas Ben Malek, a companion of Mohammed, and had settled in Cazwin, a city in Persia. From that place this author received the surname under which he has become celebrated. Of the circumstances of his life we know little more than that he was cadi of Wazith and Hillah, and died in the year of the Hegira 682 (1283 A.D.). His most important work is on natural history — 'The Wonders of Nature and the Peculiarities of Creation' — of which Ideler, professor in the University of Berlin, published the chapter on the 'Constellations of the Arabians,' and of which there are fragments in Bochart's 'Heirozoikon,' in Ouseley's 'Oriental Collections,' and in Wahl's, Jahn's and De Sacy's 'Arabic Chrestomathies.' It was the object of Cazwini, like Pliny, to describe the wonders of all nature. His work contains a comprehensive view of all that had been written before him, but in so grand and original a manner that it is of higher value than most of the original works which treat of the same subjects. There is an abridged translation of it in the Persian.

CEAN-BERMUDEZ, thā-ān' bĕr-moo'-dāth, **Juan Agustin**, Spanish art historian and painter: b. Gijon, Asturias, 17 Sept. 1749; d. Madrid, 3 Dec. 1829. He devoted himself early to the study of the fine arts, into which he was initiated by Raphael Mengs. After holding a public office at Madrid, he retired to Seville, where he founded an academy of fine arts, and occupied himself with the study of their history. He was elected a member of the royal academies of history and fine arts at Madrid, and published several valuable works connected with his favorite pursuits. His most important book, entitled 'Sumario de las anti-guedades romanas que hayan España,' appeared posthumously in 1832. He published also 'Diccionario histórico de los más ilustres profesores de las bellas artes en España' (1800); 'Descripción artistica de Sevilla' (1804); 'Diálogo sobre el arte de la pintura' (1819)); 'Noticias de los arquitectos y arquitectura de España' (1829).

CEANOTHUS, a genus of shrubs and small trees of the natural order *Rhamnaceæ*. There are about 35 species, mostly natives of the Pacific Coast region of North America. They are characterized by serrate or entire simple leaves; small, perfect, white, purplish or blue flowers in showy clusters, which are often panicled; and three-celled drupaceous fruits, which, on drying, separate into three stones. Many of the species and their hybrids are popular ornamental shrubs, especially in mild regions, their free-blooming habit rendering them specially useful as lawn specimens. Three species, *C. americanus, C. ovatus and C. fendleri*, and some of their hybrids, are hardy in the north, but usually the hybrids must either be protected from frost or stored over winter in a plant-pit or frost-proof cellar. They succeed in almost any soil, but do best in light, well-drained loams, especially when exposed to the sun. Propagation is easily effected by seeds, cuttings or layers. *C. americanus* known as New Jersey tea and red-root, is common from Canada to the Gulf States. Its leaves are said to be used as a substitute for tea, a use to which they are reported to have been put during the American Revolutionary War.

In medicine ceanothus has not been used to any great extent. Its roots contain from 6 to 10 per cent of tannin, and have been used in domestic medicine as astringents. Owing to the close resemblance of the roots, ceanothus has been used as an adulterant for rhatany.

CEARÁ, sā-ä-rä', Brazil, a state bounded on the north and east by the Atlantic Ocean and the state of Rio Grande do Norte, on the

south by Parahyba and Pernambuco and on the west by Piauhy and Maranhão. Its area is 40,250 square miles, and its population 886,686. The principal port and capital of the state is Fortaleza (q.v.), which is regarded as one of the most beautiful cities of Brazil. A railroad connects Fortaleza with Baturité. The coast regions are sandy and unproductive, the centre is occupied by an elevated plateau, sparsely watered and fit only for pasture. The climate is hot and dry. The principal exports of Ceará are: rubber, cattle, cotton, hides, mules, preserved fruits and hammocks. Coffee, sugar, wine of the cashew nut, oranges and wax are also produced. The estimated value of all the exports is about $5,000,000 annually, in which amount the United States shares to the extent of nearly one-third. Ceará is divided into 27 comarcas, or counties. The most fertile and populous district is the upper Jaguaribe. Consult Fontenelle, 'The State of Ceará' (1893).

CEARÁ-MIRIM, a city in Brazil, state of Rio Grande do Norte. It is situated on the Ceará-Mirim River and has important manufactures. Pop. 18,000.

CEBALLOS, thā-bāl'yōs, **José,** Mexican soldier: b. Durango, 15 March 1830; d. 1893. In 1869 he had command of a regiment in the province of Yucatan; while here a portion of his soldiers revolted, but he suppressed the insurrection in three days; he also executed without authority several private citizens who were implicated in the revolt. In 1870 he was made brigadier-general and given command in the western states, where he had charge of the campaign against the bandit chief, Losada. When Lerdo de Tejada became President of Mexico, Ceballos was put in command of the force sent to depose Camerana, the governor of Jalisco. After a severe struggle between the state and government forces, Caballos was successful and became governor, a position which he held till 1876. At that time Tejada was deposed by Diaz; Ceballos joined with Iglesias, but was forced to leave Mexico for a time. He went first to California, then to Guatemala, where he was appointed director of a military school. Though at first plotting a revolution against Diaz he suddenly turned to his support, returned to Mexico, was restored to his rank and made governor of the Federal district. He was a bitter enemy of the press, which he frequently antagonized, and in 1885–86 had a number of students and journalists arrested and imprisoned.

CEBES, of Thebes, Greek philosopher, a disciple and friend of Socrates and of Philolaus. He is the reputed author of three dialogues in the Socratic style — the Phrynichus, the Hebdome and the Pinax, or "votive tablet," a philosophical dialogue representing allegorically the temptations of this life and teaching that true learning can alone make for happiness. In spite of its pure Attic, and its truly Socratic tendency, modern criticism now assigns the work to the 2d century A.D. It was extremely popular in the Middle Ages, a sort of 'Pilgrim's Progress,' indeed; was translated into all the languages of Europe, as well as Arabic, which latter version, made possible in the 9th century, is our sole record of the close of the dialogue. Modern editions are those of Drosihn (1871); Kraus (1882); Parsons (1887); and Prächter (Marburg 1893).

CEBIDÆ, sĕb'ĭ-dē, a family of American monkeys, including the howler, saki, sapajou, spider-monkey (qq.v.), etc. See also MONKEY.

CEBU, thā-boo' or sē-boo', Philippines, an island lying between Negros and Bohol, north of Mindanao. Its length northeast and southwest is 139 miles; width, about 20 miles; area, 1,668 square miles. It has a mountain system consisting of a chain running the length of the island, nearer the east than the west coast. The mountains are not over 2,200 feet high, but their ascent is steep and it is difficult to cross them. There are six passes, the best being the southernmost, from Sibonga to Dumanjug, over which United States army officers constructed a temporary wagon road in the summer of 1900. The chief products are rice, chocolate, sugar and coffee. There are manufactures of hemp and piña cloth, sugar-sacks, cocoanut, wine, sugar, salt and cheese. In 1827 coal was discovered in Cebu, the first found in the Philippines. It is of good grade, adapted to general use. The trade of the island is extensive. Besides the mountain passes there are two main highways, one on the east coast, and one on the west coast, while the port of Cebu has communication with Manila and the islands of the Visayan group. Cebu was first occupied by United States troops in February 1899. Operations against the insurgents resulted in driving them from their position, and capturing a large quantity of material of war. This island, with a few dependent islands, forms the province of Cebu, in which civil government was created under the provincial government act of 1901. At that time several of the cities had organized their municipal governments according to the code of the Philippine commission. Though the province was restored to military government for a time in 1901, civil government was permanently resumed in January 1902. The entire province has about 660-000 inhabitants; the island about 600,000; the capital about 60,000.

CEBU, Philippines, capital of Cebu province, situated on the east coast of the island of Cebu. The streets are wide and regularly laid out. There is a cathedral in one of the suburbs, and it has also several other churches and an episcopal palace. Cebu is an important port with an extensive trade, being the chief commercial centre of the Visayan group. It is the oldest Spanish settlement in the Philippines. In the "Rizal," a building in front of the Santo Niño Church, is the cross which it is said was planted near the town by Magellan when he took possession of the island. An old fort built by the Spaniards stands within the limits of the town. Pop. about 60,000.

CECCHI, Giammaria, jām-mā-rē'ä chĕk'kē, Italian dramatist: b. Florence, 14 April 1518; d. there, 28 Oct. 1587. He was a lawyer who devoted his leisure hours to writing. He was the rival of Bibbiena, Machiavelli and Ariosto in portraiture of character and in liveliness of dialogue. Of his plays, 95 in number, but few have been printed. These are mainly imitations of Plautus and Terence; the best of them are

'La Dote'; 'Il Servigiale'; 'La Stiava'; 'La Moglie.' He wrote also religious dramas; among them 'L'Esaltazione della Croce' (1580).

CECCO D'ASCOLI, chĕk'kō dās'kō-lē, properly **Francesco degli Stabili,** Italian poet: b. Ascoli about 1257; d. Florence, 16 Sept. 1327; a devoted student of astrology and of demonology. For the expression and defense of certain erroneous opinions he was burned at the stake. His heretical or impious doctrines are contained in a poem, unfinished but of encyclopedic compass, 'Bitternesses,' of which he lived to complete four books. The subject of the first book was astronomy with meteorology; of the second, stellar influence with physiognomy; of the third, minerals; of the fourth, sundry problems, moral and physical. Consult Baddely, W. S. C., 'Charles III . . . also Cecco d'Ascoli, Poet, Astrologer, Physician' (London 1894).

CECH, tschĕk, **Sva'topluk,** Czech writer: b. Ostredek, 21 Feb. 1846. He was editor in succession of several journals, and at the same time practised law. He received his education at Prague. After winning some celebrity as a writer of stories and short poems, he made a bolder flight in 1872 with 'Dreams,' in which he shows great epic power. Besides this he has written several other poems, as 'The Adamites'; 'The Storm'; 'Songs of Morning.' He is the most popular of Czech poets. As a novelist he excels in lively wit and rich humor. Among his works of prose fiction may be named: 'Stories Arabesque and Humoresque'; and the amusing 'Candidate for Immortality.' He has written also 'Memories from the Orient' (1885), as well as later volumes. Consult Sutnar, J., 'S. Cechs Leben und Werke' (1898).

CECIDOMYIA, sĕs-ĭ-dō-mĭ'yą, a genus of two-winged flies, of the family *Cecidomyiidæ,* a group of gnats which cause galls (q.v.). The Hessian fly (see WHEAT, INSECT PESTS) belongs to the group.

CECIL, Evelyn, English politician: b. 1865. He is the eldest son of Lord Eustace Cecil, who is the second surviving son of the 2d Marquess of Salisbury. He acted as private secretary for several years to Lord Salisbury when he was Prime Minister. Since 1900 he has been Unionist member for Aston Manor, and has served with distinction on various parliamentary committees. He is secretary-general of the Order of Saint John of Jerusalem, and was sworn a privy councillor in 1917, a rank bearing the designation of «Right Honorable.»

CECIL, LORD **Hugh (Richard Heathcote),** English politician: b. 1869. He is the fifth son of the 3d Marquess of Salisbury, and brother of Lord Robert (q.v.). Educated at Eton and Oxford, he acted as private secretary to his father and became a prominent figure in the House of Commons as Conservative member for Greenwich, 1895–1905, first as a supporter of Mr. Balfour's Education Act 1904, and later as one of the leaders of the Unionist Free Traders in opposition to Mr. Chamberlain's Tariff Reform policy. He was defeated in the Greenwich election 1906, but was returned unopposed for Oxford University in 1910. Like his brother an ardent High Churchman, he is one of the few speakers who can venture on the expression of personal religious feelings before a political audience. During the European War he joined the Royal Flying Corps, and in 1916 was included in the Commission of Inquiry on the Mesopotamia Campaign.

CECIL, Robert, Earl of Salisbury, English statesman, second son of William Cecil, Lord Burleigh (q.v.): b. about 1563; d. Marlborough, Wiltshire, 24 May 1612. Having received the honor of knighthood he went to France as assistant to the English Ambassador. On the death of Sir Francis Walsingham he succeeded him as principal secretary, and continued to be a confidential Minister of Queen Elizabeth to the end of her reign. He gained the enmity of Lord Essex who publicly declared him traitor. Cecil was exonerated, however, and his position remains secure. Having secretly supported the interests of James I previous to his accession to the crown he was continued in office under the new sovereign and raised to the peerage. In 1603 he was created a baron, in 1604 Viscount Cranbourn and in 1605 Earl of Salisbury. In 1608 he was made Lord High Treasurer, an office which he held till his death.

CECIL, LORD **Robert (Edgar Algernon),** English lawyer and politician, third son of the 3d Marquess of Salisbury: b. 1864. Educated at Eton and Oxford, he was called to the bar in 1887 and became a Queen's Counsel in 1900. A prominent member of the Conservative (Unionist) party, he had a large parliamentary bar practice before he entered the House of Commons in 1906 to represent East Marylebone. He resigned in 1910 as a protest against the Tariff Reform movement in his party. He stood for Blackburn as a Free Trader, but was defeated; in a by-election he was returned for Hitchin in 1911. Deeply versed in ecclesiastical law, he was appointed, in March 1915, to the office of «Official Principal and Judge and Chancellor of the Consistory Court of York and Vicar-General in Spirituals of the Archbishopric of York.» On the formation of the Coalition Cabinet in May 1915 he became Parliamentary Under-Secretary for Foreign Affairs, and, in addition, Minister of Blockade for the duration of the war (February 1916).

CECIL, William, LORD BURLEIGH. See BURLEIGH.

CECILIA, Saint, Christian virgin and martyr; her day in the Roman calendar is 22 November. Her story as recounted in the 'Breviarium Romanum,' represents her as a Roman lady of noble birth, a Christian from childhood, and from her early years vowed to virginity. Yet her parents gave her in marriage to a young noble, Valerianus, whom Cecilia persuaded not only to respect her vow, but also to become a Christian; and he, converted, induced also his brother, Tiburtius, and their intimate friend, Maximus, to enter Christ's fold; shortly after these three suffered martyrdom together. Cecilia now, in anticipation of the same fate or the same crown, distributed her possessions among the poor, and this becoming known to the prefect of Rome, he ordered her to be taken to his own mansion and there burned to death in the bath (*in balneo*). But the virgin, exposed to the flames for a day and a night, was found

unhurt; and after the axe of the headsman had also failed to sever her head from her body, at last she won the double wreath of virginity and martyrdom; this was in the reign of Alexander Severus and in the pontificate of Urban I, about the year 230. Her festival is celebrated on 22 November. Urban erected a church in her house which was called by her name. The church of Saint Cecilia is still one of the most notable churches of Rome, having been again and again repaired or reconstructed. In this account of Saint Cecilia nothing is said of the musical accomplishments of the virgin, but legend makes much of them; hence, Saint Cecilia is the patron saint of music and musicians, and musical societies are very commonly called by her name: Dryden's fine ode, 'Alexander's Feast: a Song for Saint Cecilia's Day' is an imperishable monument of the Cecilian legend in English literature. Consult Guerranger, 'Sainte Cécile et la société romaine' (Paris 1873). Another Saint Cecilia was born in Africa and suffered martyrdom by starvation under Diocletian. The Roman Catholic Church celebrates her festival on 11 February.

CECILIA, a novel by Frances Burney, published in 1782. It is a typical English novel of a century ago. The plot is simple, the story long drawn out, the style stilted, and the characters alone constitute the interest of the book, and justify Dr. Johnson's praise of Miss Burney as "a little character-monger."

CECROPIA, a genus of plants of the order *Artocarpaceæ,* of which the best known species is the trumpet-tree (*C. peltata*) of the West Indies and tropical South America. It attains a height of about 50 feet, and has a hollow stem and branches, from which musical instruments are made. Its leaves are very large, circular and peltate, and serve as food for sloths; and its flowers are small and grouped in short spikes, several of which are enclosed at first in a large bract. The wood is light and soft, and is employed by the natives in various ways, particularly for the purpose of obtaining fire by friction. Ropes are made from the inner bark, and the outer bark has astringent properties. Caoutchouc is obtained from the juice, and the buds are employed as a pot-herb. Ants utilize the hollow stems as dwellings.

CECROPIA MOTH, a colossal species (*Samia cecropia*) of the family *Saturniidæ.* The moth expands five or six inches and is brick-red in color, the wings tinged with grizzly, each wing with a large crescent-shaped spot near the centre, which is red and white, or white-edged with red and black; on the apex of each fore wing is a large, black, eye-like spot. The caterpillar is a large green worm three to four inches in length, protected by large tubercles colored green, blue, yellow or red. It is not uncommon on the elder, willow, apple, currant, pear, thorn, poplar, etc. At the end of summer it spins a large cocoon, open at one end,— not oval, as in those of the allied *Telea polyphemus* and the luna moth,— and attaches it to a branch of a tree. An allied species in northern Maine and Canada is *S. columbia,* while in the Rocky Mountain region, Colorado and Wyoming it is represented by *S. gloveri* and on the Pacific Coast by *S. californica.* The silk of this species cannot be used because its fibres are not continuous.

CECROPS, sē'krŏps, according to Greek tradition, the founder of Athens, and the first king of Attica. He was said to have been an autochthon (sprung from the soil), and was sometimes represented as half man, half dragon. He taught the savage inhabitants religion and morals, made them acquainted with the advantages of social life, and laid the foundation of the future city of Athens, which after him was originally called Cecropia. According to later legend, he was responsible for the formation of a confederacy of 12 cities, the introduction of marriage, burial of the dead, writing and other arts. He is also said to have introduced the art of shipbuilding. He died after a reign of 50 years. By the later Greeks he was represented as having led a colony to Attica from Sais in Egypt about 1400 or 1500 B.C., but the best modern critics do not look upon this event nor on the life of Cecrops at all as historical. There is no doubt that Egypt did have a certain influence on the development of civilization in Greece, but how great this influence was, or in what manner exercised, history does not furnish sufficient data to enable us to decide. It is probable that the true Cecrops was a hero of the Pelasgian race.

CEDAR, various cone-bearing evergreen trees and their wood; also several non-coniferous trees. The most widely known are probably the cedar of Lebanon (*Cedrus libani*), the *deodar,* or goa-tree, of India (*C. deodara*), and the African or Mount Atlas cedar (*C. atlantica*). These are large ornamental evergreen trees with wide-spreading branches, which give them a form distinct from most other cone-bearing trees. They are sometimes planted in southern California and the Gulf States, and the last-mentioned species even as far north as Philadelphia, where it can stand the winter in sheltered situations. They are readily propagated by seeds, and thrive in well-drained, loamy soil. From ancient times their odorous, light-red wood has been used for fine furniture and interior house-finish. The white gum of the cedar of Lebanon, which oozes from the trunk and branches, was formerly employed in embalming, but the forests of this tree have become so much reduced that neither the resin nor the oil made from it are in commerce. The other species are most abundant, the deodar in India and the Atlas cedar in northern Africa. Their timber is widely used for fine cabinet work.

The red cedar (*Juniperus virginiana*) is a well-known very variable tree found from Canada to Florida, and westward to the Great Plains. It attains a height of about 80 feet; has a conical more or less spreading head with upright limbs; evergreen, spiny, pointed leaves and bluish globular fruits covered with bloom. The wood is largely used for fence-posts, lead pencils, etc. The white cedar (*Chamæcyparis thyoides*) is also a well-known American tree found in wet ground from New Hampshire to Florida. It attains a height of 70 to 80 feet; has erect spreading branches, thin and flat pendulous twigs, fragrant green leaves, and tiny bluish-purple cones covered with bloom. The trees are highly ornamental, and, being hardy, are general favorites in the North. The wood is especially useful in moist places. The name white cedar is often applied to the arbor

vitæ (*Thuja occidentalis*). The yellow cedar (*Chamæcyparis nootkatensis*), a common tree on the Pacific coast from Oregon to Alaska, is valued, in cabinet work and interior house-finishing, for its light-yellow wood, which takes a high polish. Like its relative mentioned above, it is often planted for ornament. In its home it often exceeds 100 feet in height. The best known non-coniferous trees that are sometimes called cedar are probably *Cedrela odorata* (see CEDAR, BARBADOES) and *Cedrela toona*, the Australian cedar. See TOONA; JUNIPER.

CEDAR, Barbadoes, SPANISH CEDAR, or MEXICAN CEDAR, a tall tree (*Cedrela odorata*) of the natural order *Cedrelecæ*. It is a native of the West Indies, where its wood is highly valued for making certain kinds of furniture, cigar-boxes, canoes and shingles. It is also exported for the manufacture of lead pencils. It often attains a height exceeding 75 feet and a great girth. It bears pinnate leaves 10 to 20 inches long; pendulous terminal panicles of inconspicuous whitish flowers, followed by dehiscent fruits about half an inch in diameter, containing numerous flat-winged seeds. The bark, leaves and fruits smell like assafœtida, but the wood is pleasantly fragrant. The tree is often planted for its ornamental qualities, especially along avenues. It thrives in southern California and in the Gulf States. Several of its relatives, especially *C. sinensis*, which is hardy as far north as Philadelphia, are also similarly used. See TOONA.

CEDAR-APPLES, fungous outgrowths upon juniper and red cedar trees. They are caused by some species of the parasitic fungus, gymnosporangium, one of the rusts. At the first they appear like warts upon the smaller branches and twigs, becoming chocolate color or brown as autumn advances, and remaining attached and unchanged until spring, when they enlarge into horn-shaped, jelly-like masses that resemble sponge. At this time they produce their abundant spores which, as the masses become dry, are blown away by the wind and, alighting on apple-trees, produce rust on the foliage and other green parts. They will not germinate upon cedar or juniper, but require an alternate host, the apple, to complete their life cycle. For methods of control see APPLE; FUNGICIDE.

CEDAR-BIRD, the common American wax-wing (*Ampelis cedrorum*), a bird found throughout North America, breeding from the latitude of Kentucky northward. In most localities it is only partially migratory. It is a beautiful bird of delicate unobtrusive colors, generally ashy-brown with a purple tint on the head, the front of which, like the throat, is black. The tail-feathers are tipped with yellow, and the secondaries have red tips. The head is gracefully crested. The cedar-birds spend most of the time in flocks, which wander according to the supply of food and are noteworthy for the uniformity with which all members alight or rise together. The food consists chiefly of berries when these are to be had, on which account they have received the name of cherry-birds in some sections. Nesting takes place late, when the summer is well advanced, and the rather bulky structure is usually placed in an apple or other orchard tree. The eggs are four to six in number, pale blue and thickly speckled.

CEDAR CREEK, a stream in Shenandoah County, Va., flowing into the north fork of the Shenandoah River.

CEDAR CREEK, Battle of. After the battle of Fisher's Hill, 22 Sept. 1864, General Sheridan followed Early as far as Harrisonburg, his cavalry going as far as Port Republic, Staunton and Waynesboro. In view of the difficulty of supplying his army so far from its base, and of other operations by which two corps of infantry and a cavalry division of his army were to be sent to the Army of the Potomac, he holding only the lower valley of the Shenandoah, Sheridan, after ordering the destruction of all mills, barns, grain, forage and provisions of all kinds, began to withdraw down the valley on 5 October, and on the 8th recrossed Tom's Brook. His rear had been so persistently followed and harassed by the Confederate cavalry divisions of Rosser and Lomax that he ordered Torbert, his cavalry commander, to whip the Confederate cavalry or get whipped. On the morning of the 9th Torbert fell upon Rosser and Lomax, and in a two-hours' contest routed them, pursuing many miles and capturing over 300 prisoners, 11 guns and 40 wagons. Sheridan then resumed his march, and on the 10th halted on the north bank of Cedar Creek. Wright's 6th corps continued its march to Front Royal, on the way to Washington, where it remained two days, and then marched toward Ashby's Gap, but was recalled to Cedar Creek, where it arrived on the 14th. Early had been reinforced by Kershaw's division and about 600 cavalry, increasing his force to about 18,000 men, and under Lee's order to detain the Union troops in the valley he had followed Sheridan, arriving at Fisher's Hill, six miles from Cedar Creek, on the 13th. On the night of the 15th Sheridan left for Washington to consult with Stanton and Halleck, leaving Gen. H. G. Wright in command of the army. Sheridan's cavalry accompanied him to Front Royal, from which point he intended to push it through Chester Gap to the Virginia Central Railroad at Charlottesville and raid the country east of the Blue Ridge, but upon erroneous information that Longstreet was moving to join Early, the raid was abandoned and Torbert moved the cavalry back to Cedar Creek. On the night of the 18th Emory's 19th corps was on the west side of the valley turnpike, on elevated ground overlooking Cedar Creek. Wright's 6th corps in reserve to the right and rear of the 19th, separated from it by Meadow Brook. Merritt's cavalry division was on the right of the infantry, and Custer's division one and one-half miles beyond Merritt's, watching the crossings of Cedar Creek and the roads on the right. Crooks' 8th corps was on the east side of the pike, one of its two divisions (Thoburn's) on a rounded, entrenched hill, one-fourth of a mile in advance of the other, near the junction of the creek and river, and both somewhat in advance of the 19th corps on the right. Two cavalry brigades of Powell's division were far to the left, near Front Royal, and one at Buckton Station, two miles beyond Crooks' left. The Union army numbered about 31,000 men. Reconnaissances were sent out daily from the flanks to see what Early was

doing, and that of the 18th reported that the indications were that he had retreated from Fisher's Hill. He had not retreated, but had matured a plan of attack. A reconnaissance by General Gordon had disclosed the fact that the left of the Union line was lightly picketed, with but a small cavalry force on the north fork of the Shenandoah, and that it was practicable to move infantry secretly by night across the creek, which was easily fordable, and through the woods to within less than half a mile of Crooks' left and rear. This plan Early adopted, assigning for the movement the divisions of Gordon, Ramseur and Pegram and Payne's cavalry brigade, all under command of Gordon. Early, with the divisions of Kershaw and Wharton and all his artillery, was to co-operate in the effort to crush the Union left and centre. Two brigades of cavalry were to demonstrate on the Union right, and Lomax's cavalry, moving by Front Royal, was to strike the valley pike in the Union rear. The movement began after dark of the 18th. Gordon led his column across the north fork of the Shenandoah, down its right bank, and again crossing below the mouth of Cedar Creek, reached his assigned position before daylight. Early led Kershaw across Cedar Creek, midway between its mouth and the pike, and at the first flush of dawn, covered by darkness and fog, captured or drove in the picket line and rushed over the entrenchments held by Thoburn's division, at a point where they were not manned, surprised the camp, soon swept everything out of it, and captured seven guns, which were turned upon the fugitives. Kershaw then advanced on R. B. Hayes' division and Kitching's brigade, and at the same time Gordon charged out of the woods directly upon Hayes' left and rear, the combined attacks breaking his division and Kitching's brigade, and uncovering the left of the 19th corps, which was now assailed by Kershaw and Gordon, while at the same time Wharton's division, moving swiftly down the pike, followed by 40 pieces of artillery, attacked in front, and the greatest part of the 19th corps, abandoning 11 guns, was swept from the field. Wright, who had foreseen at the beginning of the attack that his position was untenable, and a change of front necessary, now ordered the 6th corps, under General Ricketts, who was moving with two divisions to support the left, to fall back to some tenable position, and the 19th corps was ordered to rally on the right of the 6th. The Confederates followed up their advantage, taking many prisoners, but were checked by the 6th corps, Wharton being badly repulsed. Early still pressed matters; it was now 9 o'clock, and Wright, losing six guns of his own corps, withdrew to a more favorable position one and a half miles north and west of Middletown, where he was joined by the cavalry brigade from Buckton and by Torbert, with the two cavalry divisions that had been ordered from the right to left of the infantry line; while the division commanders of the 6th and 19th corps were told the enemy would be attacked about 12, noon, as soon as an ample resupply of ammunition could be issued. Meanwhile Sheridan, who had arrived at Winchester on the afternoon of the 18th, was hastening to the front, meeting on the way a stream of fugitives, whom he ordered to turn back, as he intended to reoccupy the old camp that night. He arrived on the field a little after 11 o'clock, during a lull in the fight, after Wright had reunited the divisions of the 6th corps, which had been fighting by themselves during the morning, and after the 19th corps had been rallied and placed in line, also parts of the 8th corps, the only part of the army seriously engaged being a division of the 6th corps and the cavalry, tenaciously holding the valley pike, the key-point of the battle. Wright's disposition of the infantry was approved, and the only change made in the line was to send Custer's cavalry back to the right of the infantry. About 1 o'clock Early pushed forward his entire line, but was quickly repulsed, and then busied himself in collecting his stragglers, who were plundering the captured camps, getting his prisoners and captured guns and wagons back to Fisher's Hill, and throwing up a defensive line beyond the reach of the Union artillery. At 4 o'clock Sheridan saw a movement of Early's, which he thought indicated an attack, and ordered a general advance, the 19th corps on the right, the 6th on the left, with the 8th following in reserve, Custer's cavalry on the right, and Merritt's on the left of the infantry. The movement developed into a left half-wheel, and after a very severe and obstinate fight, during which parts of the Union line were repulsed, again to go forward, was successful; the Confederate line was broken near its left, other parts of the line gave way, and soon the entire army fled in panic and disorder from the field and across Cedar Creek, Sheridan's infantry following as far as the creek, the cavalry continuing the pursuit three miles beyond and until after dark, capturing guns, wagons, ambulances and prisoners. Early, with but few of his men, rested at night in his entrenchments at Fisher's Hill, and at 3 o'clock next morning retreated to New Market, followed by Sheridan's cavalry as far as Woodstock. The 24 guns captured by Early were retaken, and he left in Sheridan's hands 23 of his own. The Union loss was 644 killed, 3,430 wounded and 1,591 missing; of the latter 1,429 were sent as prisoners to Richmond. The Confederate loss was 320 killed, 1,540 wounded and 1,050 missing. Early's offensive movement suspended for a time the transfer of any part of Sheridan's army to the Army of the Potomac; his defeat ended efforts on the part of the Confederates to invade the North by way of the Shenandoah Valley. Consult 'Official Records' (Vol. XLIII); Pond, 'Shenandoah Valley in 1864'; The Century Company's 'Battles and Leaders of the Civil War' (Vol. IV); Sheridan, 'Personal Memoirs'; Keifer, 'Slavery and Four Years of War' (Vol. II).

E. A. CARMAN.

CEDAR FALLS, Iowa, city in Black Hawk County, situated on Cedar River and on the Burlington, C. R. & N., the Illinois Central and the Chicago & G. W. railroads, 85 miles northeast of Des Moines. It is actively engaged in manufacturing, having flour, oatmeal, paper, harvester, gate, wagon, pump, broom and other factories. The Iowa State Teachers' College is situated here and has an average attendance of 3,200. The city owns its waterworks and electric-lighting plant, and maintains a Carnegie library, good schools, a hospital,

two parks and has shown marked growth in recent years. It was settled in 1845, incorporated as a village in 1853 and received its civic charter in 1865 providing for a mayor elected every two years and a city council. Pop. (1910) 5,012; (1916) civic estimate, not including college students 7,000.

CEDAR KEYS, Fla., seaport in Levy County, on the Gulf of Mexico, 118 miles southeast of Tallahassee. It takes its name from the keys surrounding the harbor. There is a lighthouse on one of the keys, with a fixed white light, varied by a white flash every minute. The town has several saw-mills, most of which cut red cedar wood for pencils, which is a leading export. It has a considerable trade also in pine, sponges, palmetto fibre, lumber, fish and oysters. Pop. (1910) 864.

CEDAR LAKE, lake of Canada, in Manitoba, an expansion of the river Saskatchewan, receiving the waters of this large stream to pour them over the Grand Rapids into Lake Winnipeg. Cedar Lake is nearly 30 miles long, and where widest 25 broad; area, 285 square miles. Its depth of water is sufficient for the largest craft, except on the northwest, where the quantity of alluvium brought down by the Saskatchewan is rapidly filling it up. Both the mainland and the islands are well wooded with balsam, spruce, birch, poplar, tamarack, Banksian pine and cedar, the last growing on the shores of the lake, particularly the northwest, and giving it its name.

CEDAR MOUNTAIN, CEDAR RUN, or SLAUGHTER'S MOUNTAIN, Battle of. On 8 Aug. 1862, Crawford's brigade of Banks' corps marched from Culpeper Court-house, eight miles to Cedar Run, to support Bayard's cavalry brigade, which was being driven back by Stonewall Jackson, who, with the three divisions of C. S. Winder, Ewell and A. P. Hill, in all nearly 24,000 men, was advancing from Gordonsville to seize Culpeper. On the 9th Banks' entire corps, at Little Washington, was ordered to follow Crawford, and Sigel was ordered to march his corps from Sperryville to the same point. Banks joined Crawford at Cedar Run about noon and took position on elevated ground just beyond it, covering the road to Culpeper, Crawford's brigade and six companies of the 3d Wisconsin, of Gordon's, on the right of the road, being partially hid in woods. Gordon's brigade was held in reserve on the hither side of the stream. Across the road on Crawford's left was Geary's brigade; Prince's brigade was on Geary's left, and Greene's small brigade to the left of Prince and somewhat removed. Seven batteries of artillery were distributed on the plateau slightly in advance of the infantry. Banks had about 8,000 men. Jackson crossed the Rapidan on the 8th, and about noon of the 9th drove back Bayard's cavalry, and following, came under fire of the Union artillery and prepared for battle. Early's brigade was ordered to advance, keeping to the right and close to the Culpeper road, while Ewell led his two other brigades further to the right along the slope of Cedar Mountain. Early advanced until he came under severe artillery fire, when he halted under cover of a small hill and C. S. Winder's division and three batteries came up on his left, Campbell's brigade on the extreme left, then Taliaferro's, with Winder's brigade in reserve. While placing his batteries on and near the road Winder was mortally wounded by a piece of shell. It was now 5 o'clock, and Banks gave the order to advance and attack. The three brigades of Crawford, Geary and Prince threw out skirmishers, drove in those of the Confederates, and the main line advancing became severely engaged. Early's right held its own against Prince, but on the Union right Crawford, advancing with great impetuosity, attacked and routed Campbell's brigade; then swung to the left, fell upon and (with the assistance of Geary) routed Taliaferro and shook Early's left. It was going hard with Early when Hill's division came up and, forming on his right and left, restored the fight, checked Crawford's further success, drove him and Geary back, and held Prince in check. Then the 10th Maine, of Crawford's brigade, which had been held in reserve, went forward on the extreme right, and in less than 10 minutes was compelled to retreat with a loss of nearly one-half its men. At the same time a battalion of Pennsylvania cavalry charged down the road and was instantly driven back in disorder. Gordon's brigade came on the field as the 10th Maine was going out. In its advance it moved a little to the right of where the 10th Maine had been, and was met by the brigades of Branch, Archer and Winder, with such a withering front and flank fire that it was badly cut up and parts of it driven off, again to rally and go forward; but, under cover of the woods, Pender's brigade gained its right and rear, poured in a volley and drove it from the field. The artillery had now been withdrawn and the Confederates advanced. Prince's brigade fell back, leaving Prince and many of the men prisoners, and Greene, on the extreme left, who had not been seriously engaged, but had held Ewell's two brigades in check, was withdrawn. Night had now fallen, but Jackson, desiring to enter Culpeper before morning, gave immediate pursuit, and when one and one-half miles from the field was checked by Banks' rallied troops and Rickett's division, which had come up from near Culpeper, followed later by Sigel. General Pope also had arrived and assumed command. The Union loss was 1,759 killed and wounded and 594 missing. The Confederate loss was 1,338 killed and wounded and 31 missing. Pope and Jackson confronted each other on the 10th and 11th, but on the night of the 11th Jackson retreated, abandoning many of his wounded, recrossed the Rapidan and marched to the vicinity of Gordonsville. Consult 'Official Records' (Vol. XII); Ropes, 'The Army Under Pope'; Gordon, 'Army of Virginia'; Allan, 'Army of Northern Virginia in 1862'; The Century Company's 'Battles and Leaders of the Civil War' (Vol. II).

E. A. CARMAN.

CEDAR MOUNTAINS, a mountain range in Cape Colony extending nearly along the meridian of 19° E., for about 25 miles southward, beginning with lat. 32° S., and rising at some places to a height of 5,000 feet, and separating the valley of the Olifante River on the west from the Doorn on the east. Cedar trees of gigantic size formerly covered these mountains, and still do so to a considerable ex-

tent. The mountains contain many Bosjesman caves. The highest summit is Sneeuwkop, about 6,300 feet.

CEDAR RAPIDS, Iowa, city in Linn County, on the Cedar River, and the Chicago & N. W., Chicago, R. I. & P., Chicago, M. & Saint P. and Illinois C. railroads, 219 miles west of Chicago and 310 miles north of Saint Louis. It is an important railway and manufacturing centre, and has valuable waterpower. The city is built on terraced hills on both sides of the river which is here crossed by several bridges. The streets are paved with brick and asphalt, and it has large and well-planned parks and excellent sewer, water, trolley, gas and electric-lighting systems. Cedar Rapids is the centre for a rich agricultural region and has an extensive wholesale trade. The city contains about 192 manufacturing establishments; capital, $6,500,000; persons employed, 6,500; wages, $4,500,000; value of products, $47,000,000. These figures did not include the American Cereal Company, whose mills employ 800 persons and have a daily capacity of 5,000 barrels. The Chicago, Rock Island & Pacific Railway shops employ nearly 1,000 men. Other industries are pork-packing, and the manufacture of flour, cereals, pumps, windmills, starch, furniture, agricultural implements, dairy, creamery and egg supplies, wagons and carriages, planing-mill products and confectionery. The United States census of manufactures for 1914 recorded 170 industrial establishments of factory grade, employing 5,669 persons, of whom 4,394 were wage earners, receiving yearly $2,727,000 in wages. The capital invested aggregated $20,281,000, and the year's output was valued at $34,989,000: of this, $9,041,000 was the value added by manufacture. There are three national and seven other banks; and daily, weekly and monthly newspapers. Cedar Rapids is the seat of Coe College (Presbyterian), has excellent public and private schools, a business college and public and Masonic libraries. It has many handsome private residences and churches, hospitals, a post office and Federal court building, Masonic Temple, auditorium and fine business and railway buildings. The first settlement at the rapids of the river was in 1845. The city was incorporated in 1856, and the charter revised in 1898. The mayor and city council are elected for two years. Pop. 40,690.

CEDAR, or RED CEDAR, RIVER, a river rising in the southern part of Minnesota and flowing southeast through the eastern part of Iowa to Muscatine County, where it turns southwest and empties into the Iowa River at Columbus Junction, after a course of about 350 miles. The chief cities along its course are Waterloo, Vinton and Cedar Rapids.

CEDARTOWN, Ga., city and county-seat of Polk County, 60 miles north by west of Atlanta, on the Central of Georgia, the Louisville and Nashville and the Seaboard Air Line railroads. The city has important lumbering and mining interests; cedar and pine abound in the district and there are valuable mineral deposits. The industrial establishments comprise a box factory, planing mills, knitting mills, iron furnaces and foundries, oil mills, fertilizer works, railroad repair shops and marble works. The city owns the electric lighting and waterworks. Pop. 3,551.

CEDILLA, sẹ-dĭl'la, a mark used under the letter c in French and Portuguese when the c stands before a, o or u, to indicate that it is to be pronounced like the English s, not like k, as is usual before these letters. A c with the cedilla under it is written ç.

CEDRELA, sĕd'rē-la, a genus of large timber trees, natives of the tropics of both hemispheres, giving name to the order *Cedrelaceæ,* which is now usually included in *Meliaceæ.* The species have evergreen, equally pinnate leaves, and small bell-shaped white flowers. *C. odorata* of Honduras and the West Indies yields bastard cedar. *C. australis* is a valuable Australian timber tree. *C. toona,* a native of Bengal, furnishes timber much like mahogany. The bark is very astringent, and has been found valuable in fevers, dysentery, etc. The flowers are used for producing a red dye. The bark of *C. febrifuga* is used against the intermittent fevers of Java.

CEDRELACEÆ, sĕd-rē-lā'sē-ē, the mahogany family, a natural order of dicotyledonous plants, nearly allied to, if really separate from, the *Meliaceæ.* They are trees with alternate pinnate leaves and a woody capsular fruit. Different species yield mahogany, satin-wood, etc. The typical genus is *Cedrela.*

CEFALU, chă'fā-loo', Italy, seaport city of Palermo province, Sicily, on the north coast, 40 miles east-southeast of Palermo. The town is named from the headland which rises 1,200 feet above it bearing on its summit ruins of an ancient Sicel town. Cefalu is a bishop's see and its buildings include a fine cathedral and several other churches. The harbor is small, capable of accommodating only a few vessels. Sea-fishing is actively engaged in and profitable marble quarrying is carried on. Pop. 13,300.

CEHEGIN, thā-ā-hēn', Spain, town in the province of Murcia and 39 miles west-northwest of the city of Murcia, four miles east of Caravaca, on a declivity facing the south. It has numerous spacious streets, and two squares, lined with substantial houses and neat public buildings, comprising a parish church, three chapels, town- and court-houses, a prison, hospital, theatre, cemetery and several schools. The manufactures include paper, cloth, soap, pottery, brandy, wine and oil. There is also trade in grain, oil, wine, fruits, wool, hemp, silk, wax, and cotton. Pop. 13,313.

CEILING, the interior overhead surface of an apartment usually formed of a lining of some kind affixed to the under side of joists supporting the floor above, or to rafters; the horizontal or curved surface of an interior opposite the floor. The word seems to have been suggested by the use of arched coverings for churches, and even for rooms, which prevailed in the Middle Ages, and were not unknown to the ancients. In Egyptian temples the undersides of the flat stone roofs were ornamented with blue paint and yellow stars and other hieroglyphics of the heavens. The ceilings of Babylonia and Assyria were often gilded and stuccoed. Greek roofings were decorated inside with ornaments. Arched ceilings among the Romans were known by the name cameræ or camera, the Greek origin of

which seems to furnish an argument in favor of the view that the arch was known to the latter people. The camera was formed by semicircular beams of wood, at small distances from each other, over which was placed a coating of lath and plaster. In later times the cameræ were frequently lined with plates of glass, when they were termed vitreæ. But the ceilings most common among the Romans were flat, the beams, as in modern times, having been at first visible and afterward covered with planks and plaster. Sometimes hollow spaces or panels were left between the planks, which were frequently covered with gold and ivory, or paintings. The arched ceilings of the Romans were commonly of brick or concrete covered with stucco, and were of three kinds: barrel vaults, groined vaults, and domes. The Roman ceilings were always elaborately decorated with stucco or paintings, as seen in those of the Pompeian baths. After the decline of Roman art, ceiling decoration became obsolete in the West, to be revived after the Romanesque Period. But Byzantine art, with its inventions of glass, developed new and wonderful types, using curved roofing and mosaics wherever possible. Good examples are the Saint Mark's in Venice, and the churches at Salonica and Constantinople. Mohammedan art developed a similar form. In the West, in the Middle Ages, the ceiling design took the form of bare rafters, which was later replaced by vaulting of stone and flat wooden ceilings. In England, the simpler forms prevailed; while in France, the multiple rib vault and the elaborate fan vault developed. The wooden ceilings were decorated in the hammer-beam types of English churches and halls, which lasted until the 17th century. During the Renaissance, Italy used three types of ceiling, the smooth vault; the same with penetrations, having a flat central field and curves; and the flat paneled ceiling of wood or plaster, of which the most magnificent example is that in the Doge's palace at Venice, highly decorated with paintings by Titian, Tintoretto and Veronese. In England, at Coleshill, Berkshire, a ceiling by Inigo Jones (1650) shows a type which became predominant for a century: deeply sunk panels with medallions around and bands enriched with foliage, fruit, etc., in bold relief. The present type generally used is the one developed by Robert Adam. Modern ceilings are generally flat and are of plaster or wood. When the ceiling is divided into deep panels it is said to be coffered.

CELAKOVSKY, chā-lä-kŏv'skē, **Frantisek Ladislav**, Bohemian poet and philologist: b. Strakonitz, 7 March 1799; d. Prague, 5 Aug. 1852. He was destined for the pulpit, but from patriotic impulses declined to adopt that profession, and engaged in 1821 as instructor in a nobleman's family. In 1828 he became associate editor of the *Quarterly Review for the Catholic Clergy*, published by the consistorium at Prague, and in 1834 editor of the *Bohemian Gazette*, and of the *Bee*, a literary journal. He also commenced a series of lectures on the Czechic language and literature, at the University of Prague. He lost both his situation as editor and that at the university, in consequence of a remark against the Emperor Nicholas. The Bohemian Society for the Propagation of Science elected him a member in 1840. In 1842 he accepted a professorship of the Slavic language and literature, recently established by the King of Prussia for the benefit of his Polish subjects, at the University of Breslau. After the events of 1848, the Austrian government, which now sought for support from the Czech nationality, offered him a professorship at the University of Prague. Of his numerous works, the following are most remarkable: 'Poems' (1822); 'Slavic National Songs' (1822–27); 'Lithuanian National Songs' (1827); a metrical translation of Walter Scott's 'Lady of the Lake' (1828); a translation of Augustine's 'De Civitate Dei' (1829–32); 'Echo of Russian National Songs' (1829); 'Echo of Czechic National Songs' (1840). One of his latest works was the 'Popular Philosophy by the Slavic Nations in their Proverbs' (Prague 1851). After 1835 Celakovsky was engaged in a comparative study of all the Slavic dialects, the fruit of which is given in part in his additions to Jungmann's Czechic dictionary. As a poet he is distinguished by the grace and naïveté of his popular songs.

CELAKOVSKY, Ladislav, Austrian botanist, son of the preceding: b. Prague 1834; d. there 1902. He was educated at Prague, where, in 1860, he was appointed custodian of the botanical department of the Bohemian Museum. In 1882 he became professor of botany at the Czech University of Prague. His works are numerous and valuable. They include 'Prodromus der Flora von Böhmen' (1867–81); 'Über die morphologische Bedeutung der Samenknospen' (1874); 'Vergleichende Darstellung der Placenten in den Fruchtknoten der Phanerogamen' (1876); 'Die Gynmospermen' (1890); 'Das Reduktionsgesetz der Blüten' (1895).

CELANDINE, sĕl'ạn-dĭn (*Chelidonium*), a genus of herbs of the family *Papaveraceæ*. The few species are natives of Europe, where they are widely distributed, and whence they have spread to other parts of the world. One species is common in some of the older parts of the United States, having escaped from gardens. Common celandine (*C. majus*), which is most frequently seen, is an ill-smelling biennial or perennial plant with brittle hairy stems, pinnate leaves, small yellow flowers in umbels and slender two-valved pods. The plant has long been popular in old-fashioned gardens. It is easily grown from seed and produces abundant flowers all through summer. All parts contain an acrid yellow juice, for which the plant has been sometimes used in medicine, though it is now used practically onlv by the Eclectics. It is a drastic purgative, but its action is very irregular and difficult to control, and hence it has not been introduced into regular medicine.

CELANO, chā-lā'-nō, **Tommaso da**, one of the reputed authors of the Latin hymn 'Dies Iræ': b. Celano, in the Abruzzi, toward the end of the 12th or about the beginning of the 13th century; d. Italy after 1250. He was one of the most devoted adherents of Saint Francis of Assisi, and after the establishment of an order of Minorite friars on the Rhine, was appointed keeper (custos) of the Rhine districts. In 1230 he returned to Italy. He wrote a life of Saint Francis and several hymns. His claim to the authorship of the 'Dies Iræ' seems now fairly

well established, but is still disputed in favor of Matthäus Aquasparta (d. 1303), Cardinal Frangipani (d. 1294), and even Saint Bernard, Gregory the Great and others. His name is first mentioned in connection with the poem toward the close of the 14th century. See DIES IRÆ.

CELASTRACEÆ, sĕl-ăs-trā'sē-ē, a family of polypetalous dicotyledons, consisting of shrubs and small trees, natives of southern Europe, Asia, America, Australia, etc., most of them of no great importance. They have generally acrid properties. The chief genera are *Celastrus* and *Euonymus.*

CELAYA, sā-lä'yą, Mexico, town in the state of Guanajuato, on the Rio Grande de San Jago, about 150 miles northwest of the city of Mexico. It has several fine plazas, handsome churches, among which is that of Our Lady of Carmen, a magnificent structure, and manufactures of cotton and woolen cloths, soap, candles, saddlery and other articles. The burning of its bull-ring, on Easter Sunday, 1888, caused considerable loss of life. Near it are thermal springs. Celaya was founded in 1570 and in 1655 was raised to the dignity of a city by Philip IV. It was sacked by the revolutionists in 1810. Pop. about 25,500.

CELEBES, sĕl'ĕ-bĕs or sĕl'ĕ-bēz, Dutch East Indies, one of the larger islands of the Indian Archipelago, between Borneo on the west and the Moluccas on the east, extending from lat. 1° 45′ N., to 5° 45′ S., and from long. 118° 45′ to 125° 17′ E. and remarkable for the singularity of its shape. It consists mainly of four large peninsulas stretching to the east and south, and separated by three deep gulfs. This singular conformation gives it a shore line of 3,500 miles. The total area of the island is a little over 71,000 square miles.

Celebes is high and mountainous chiefly in the centre and the north, where there are several active volcanoes. Mount Bonthain, which is in the southern part of the island, is over 10,000 feet high. The absence of extensive deltas, and the intervention of broad grassy plains between the forests, distinguish it from the other larger islands of the Indian Archipelago. All that is most majestic and lovely in these are concentrated in this island. It abounds in the most picturesque and varied scenery, and the most beautiful and magnificent tropical vegetation. Though cut by the equator, and wholly within the torrid zone, Celebes is considered remarkably healthful, the natives often enjoying a vigorous old age, and Europeans living longer than anywhere else in the East. Its extreme heats are tempered by the sea-breezes, by monthly rains, and by the north winds that prevail for part of the year. The east monsoon lasts from May to November, and the west during the remaining months. The soil generally consists of a bed of vegetable mold from 10 to 20 feet thick, on decomposing basalt. Gold is found in all the valleys of the north peninsula, which is often convulsed by earthquakes and abounds in sulphur. Copper of good quality occurs at various points, and in Macassar tin also, as pure as that of Banka. Diamonds are sometimes found almost at the surface of the ground, and precious stones are carried down in the sand of the torrents. The island is entirely destitute of the large carnivorous animals and pachyderms. None of the cat kind are seen in its forests; nor has it the elephant, the rhinoceros or the tapir. Deer and wild hogs abound, together with the babirussa and herds of antelopes. Pouched animals, unknown in the Sunda Islands, here first occur, and there is a black tailless baboon or ape. Among domesticated animals are found small but vigorous horses, buffaloes, goats, sheep and pigs. Trepang and turtle are caught in abundance. Among the trees are the oak, teak, cedar, upas, bamboo, etc.; among plants requiring more careful cultivation, the coffee-tree, indigo, cacao, sugar cane, manioc root and tobacco.

The maritime districts of Celebes are inhabited by Malays; the peninsula of Macassar by Bugis and Macassars. Mandhars dwell in the west of the island, and the mountainous regions in the interior are inhabited by Alfurese. In the harbors also there are many Chinese and Oorang Badjus or Oorang Laut, a mixed race partly of Malay and partly of Battak origin, who live in their boats, and roam over the whole archipelago, gaining their livelihood by fishing. The natives are subject to several petty rulers, more or less dependent on the Dutch. The capital is the town of Macassar (pop. 26,000), in the southwest of the island, in the bazaar of which are sold all the products of the neighboring islands as well as of Celebes itself. Among these are bamboo canes, sandal-wood, cajeput oil, nutmegs, rice, coffee, pearls, birds'-nests, trepang, birds of paradise, etc. The trade in trepang is very important, Macassar being the chief staple place for this article of commerce. The chief harbor of the north is that of Kema, on the east coast of Minahassa. The coffee of Menado is excellent, and is even preferred to the best Javanese coffee. The harvest of cocoanuts is considerable. Imports and exports average about $13,000,000. A European controller superintends the cultivation of the coffee-tree in his own district, advises the village chieftains, acts as the protector of the natives and negotiates between them and the Dutch government.

The languages and literature of Celebes differ essentially from those of the countries to the west. The letters of its alphabet are in form as unlike the Javanese as the latter are unlike the Arabic or Roman. The three great languages of the island, not reckoning the dialects of the savage tribes, are those of the Bugis, the Macassars and of Mandhar. The modern Bugis is the most cultivated and copious; the Macassar is simpler and its literature more scanty; both are distinguished for a soft and vocalic pronunciation. The Bugis have a considerable body of literature. The more civilized inhabitants profess Mohammedanism; but previous to the introduction of that faith the Hindus had brought their religion to the island.

The island of Celebes was first visited by the Portuguese in 1512. In 1607 the Dutch entered into commercial relations with Macassar, and gradually acquired and extended control until, early in the 19th century, they made their supremacy complete. There was a serious revolutionary outbreak in 1905–06. The population is estimated at 2,000,000, of which about 1,400 are Europeans. Consult Lahure, 'L'Île de Celebes' (1879); Wallace, 'The Malay Archi-

pelago' (1880); Sarasin, 'Reisen in Celebes' (1905); 'Versuch einer Anthropologie der Insel Celebes' (1905–06).

CELERES, a body of horsemen traditionally said to have been introduced by Romulus, and to have numbered 300, consisting of citizens rich enough to furnish a horse. They are also described as subdivided into three centuries, under the name of Ramnes, Titienses and Luceres. The number of the centuries of the Celeres is said to have been raised to six by Tarquinius Priscus, this being the origin of the equites or knights, who in after times formed a separate class of citizens.

CELERIAC, sē-lĕr'ĭ-ăk, a plant, *Apium graveolens rapaceum*, of the parsley family, and a horticultural variety of celery. It is highly prized as a vegetable in Europe but is little grown in America. Unlike celery, the plant has a very thick, fleshy root; this is used in flavoring stews or it may be boiled like cauliflower or used in salads. An extract obtained from the root is said to have medicinal properties.

CELERY, a biennial or annual herb (*Apium graveolens*) of the family *Apiaceæ*. It is a native of Europe, Asia and Africa, in the older civilized parts of which it was cultivated prior to the Christian era. In nature the plants are commonly found in moist ground, where they attain a height of from 6 to 15 inches. They have numerous leaf-stalks, odd-pinnate leaves and branching, leafy flower-stalks two to three feet tall, bearing many small umbels of small white flowers which give place to small seeds (fruits). Cultivated celery does not differ in general characteristics from the wild plant, but by cultivation its leaf stalks (the part desired for the table) have been made more solid, less stringy and more agreeably flavored. In many instances, too, they have been lengthened or increased in number and made to form more compact plants. Celery is usually blanched and eaten raw with salt, but often it is used as a cooked vegetable, and its leaves, roots or ground seeds are frequently used for flavoring. Celeriac or turnip-rooted celery is largely grown in Europe, but little in America. It does not require blanching, but is otherwise cultivated like celery.

Celery is usually started in unheated beds and the young plants set out in the field when a few inches tall, after being transplanted once or sometimes twice. The soil best suited to the plant is a rich, friable, peaty loam well supplied with moisture, but well drained. As the plant is a gross feeder abundant manure must be given. Celery will, however, do well in any moist, rich garden soil. In one method of growing, the plants are set about six inches apart in rows spaced from three to four feet, and the ground is kept loose and free from weeds by frequent cultivation, the plants being gradually covered with earth, or "earthed up," as they approach edible size, or they may be blanched by shading the stems with boards, straw, etc. In another method they are set closer together in the rows, which are rarely more than 12 inches apart. The size of the variety is a governing factor in the matter of distances; some varieties grow only 12 to 15 inches tall, others more than two and a half feet. In this "new celery culture" no earthing-up is necessary, as the plants blanch themselves. Summer celery is blanched quickly by the former method; autumn and winter celery more slowly. Indeed, the process is frequently continued in the winter storing quarters, which usually consist of specially constructed houses or cellars, the floors of which are covered with a few inches of earth, in which the roots obtain some food and water.

Celery is frequently attacked by parasitic diseases, but most of its insect enemies are controlled by parasites and rarely become troublesome enough to demand special attention. The chief fungous parasites are sunscald or rust (*Cercospora apii*), which appears upon the leaves as yellow or gray blotches which enlarge and gradually destroy the whole leaf. It is more frequent on plants grown in dry soils. Leaf-blight (*Septoria petroselini apii*) appears on the leaves and stems as watery spots which become dotted with black spores. These parasites may be controlled by spraying with a standard fungicide (q.v.). Several other parasites are occasionally troublesome, but they can usually be similarly controlled.

In the United States the celery industry developed enormously during the closing quarter of the 19th century. From being restricted to the individual gardens and fields of market gardeners who grew it as one of their ordinary crops, it has in many localities become a specialized business, with machinery adapted to its particular needs. And from demanding only part of the time of the market gardener it now occupies the attention of hundreds of men in certain districts. In Michigan, California, Florida and New York there are thousands of acres devoted to this crop, and from some of these districts hundreds of carloads of celery (even trainloads from California) are sent to Chicago, Saint Louis, Kansas City, New York, Boston, Philadelphia and other large distributing centres. Instead of having celery as a delicacy for a few weeks during autumn and winter, American tables are supplied throughout the year with this vegetable, which has risen to the rank of a necessity, a development due mainly to improvements in the management of the crop, but partly to improved transportation and storage methods.

In medicine celery enjoys a certain popular reputation by reason of the apiol which it contains. This has an action similar to that of many of the volatile oils, but in addition it dilates the blood vessels, particularly of the pelvic viscera, and is, therefore, useful in disorders of menstruation, in chronic constipation and disordered intestinal states in general. It is also diaphoretic and diuretic.

Consult Greiner, 'Celery for Profit'; Van Bochove, 'Kalamazoo Celery'; Hollister, 'Livingston's Celery Book'; Duggar and Bailey, 'Notes Upon Celery'; Cornell University Agricultural Experiment Station Bulletin 132; Bailey, 'Cyclopedia of American Horticulture.'

CELESTIAL EMPIRE, The, a popular name for the former Chinese Empire, taken from the Chinese appellation for the country, "Tien Chao" (Heavenly Dynasty). Hence the name "Celestials," applied to natives of China.

CELESTIAL SPHERE, the skyey background on which all celestial objects appear projected. It is supposed to be of indefinite

radius, with the observer at the centre. It is crossed by systems of imaginary circles which serve to fix positions upon its surface by means of spherical co-ordinates. See CO-ORDINATES.

CELESTINA, The. 'The Celestina,' or 'Tragicke Comedy of Calisto and Melibea,' one of the parent sources of modern realism, was the work of Fernando de Rojas, sometime mayor of Salamanca, whose title to the authorship recent Spanish scholarship has established to the exclusion of other claimants. Originally appearing at Burgos in 1499 (?), the 21 acts of this loose drama, or dialogued novel, provide a singularly vivid and realistic picture of the night life of a Spanish city of the Renaissance, whose more unsavory features are conveyed with a touch that is absolutely modern in its directness. The story, however, of the amours of Calisto and Melibea, as promoted by the activities of the bawd Celestina, is less happy because of the blight of long passages of scholastic dialectic and of pseudo-classical erudition which rest heavily upon it.

'The Celestina' was the point of departure of the Spanish picaresque or rogue novel, which in turn became a dominant factor in the development of the English novel. The night life is often strangely suggestive in detail of that of the roisterers of Shakespeare's 'Henry IV,' but the tone of the work is wholly satirical and sardonic. It was translated without delay throughout Europe, and has been continuously influential in Spanish letters, where the naturalistic reforms of Galdós in the drama recall its procedure.

A verse interlude based upon the first four acts was published in English in 1530. The standard translation is by James Mabbe (1631); reprinted with an introduction in the 'Tudor Translations' (1894).

JOHN GARRETT UNDERHILL.

CELESTINE I, Saint, a Pope memorable in the annals of the Church as having convoked the General Council of Ephesus, 431; as having given to Palladius and Patricius mission to the Irish and the Caledonians, and as having checked the progress of Pelagianism and Novatianism. Of his birth or his age there is no record, but he died in 431 and his day in the Roman calendar (that is, the day of his death) is 7 April; he occupied the see of Peter about eight years and a half. Celestine was represented in the Ephesian Council by his legates, and at his instance the council condemned the heresy of Nestorius and of his letters to bishops of various churches both in the East and the West, communicating to them the council's decrees, four are extant, namely: those to the African bishops and to the bishops of Illyria, of Thessalonica and of Narbonne.

CELESTINE II, Pope (GUIDO DI CASTELLO): b. Tiferno, Tuscany; d. Rome, March 1144. He had studied under Abelard, and succeeded Innocent II in 1143. It was this pontiff who granted absolution to Louis VII of France and removed the interdict which for three years was laid upon that country.

CELESTINE III, Pope (GIACINLO ORSINI): b. about 1106; d. Rome, 8 Jan. 1198. He succeeded Clement III in 1191, when, it is believed, over 80 years of age, and reigned till 1198. He crowned the Emperor Henry VI of Germany in 1191, but afterward excommunicated both Henry and Leopold, Duke of Austria, on account of the captivity of Richard Cœur de Lion. In 1192 he confirmed the statutes of the Teutonic Order of Knights.

CELESTINE IV, Pope (GOFFREDO CASTIGLIONE): b. Milan; d. 10 Nov. 1241. When a monk at Hautecombe in Savoy he wrote a history of Scotland. He was elected Pope in 1241, but reigned only 17 days, having died, it is said, of poison before the ceremony of consecration was performed.

CELESTINE V, Saint, a Pope celebrated as the one occupant of the papal see who, his title undisputed and no demand made for his retirement, voluntarily and of his own motion abdicated the pontificate. He was a Neapolitan, born in 1215, and while a lad entered the order of Benedictines. From the first he practised the greatest austerities, and at the age of 24 years, for the sake of freedom in the pursuit of religious perfection, he quitted the monastery and adopted the solitary or eremitical life in a cave of Mount Morone, whence his surname, Peter di Morone. After five years spent in this solitude he, with two companion hermits, migrated to a similar cave in the Monte di Majella in Bruttium. Here disciples flocked to him in scores, and to these he gave a rule of life and thus laid the foundation of a new monastic order which later received papal approval; after the death of the founder the order assumed the title of Celestines. While Peter di Morone was, as superior-general, governing 36 communities of the new order comprising 600 monks, he was elected Pope, 7 July 1294. He protested vigorously against this unexpected promotion, but at last was prevailed upon to assume the burden of the papacy. As Pope he promulgated two decrees, one re-enforcing the rule which requires that the cardinal electors of a Pope shall be strictly secluded in the conclave; and the other that a Pope may lawfully and validly lay down his office. At the end of five months and eight days he acted on this definition and abdicated, out of a desire, as he publicly declared, "for humility, for a purer life, for a stainless conscience, and in view of his lack of physical strength, his ignorance, the perverseness of the people, and his longing for the tranquillity of his former life." All eminently strong and good and honorable reasons, and worthy of the sincerely religious soul that was moved by them. His successor in the papacy, Boniface VIII, doubtless fearing lest the honest hermit should repent of his abdication and resume the papal title, made him a prisoner and confined him in a strong castle where he died, after languishing 10 months, 19 May 1296. He was canonized in 1313. Some commentators of Dante ('Inferno,' iii, 60) think that Celestine is the damned soul,

> Who to base fear
> Yielding, abjured his high estate

(Cary's trans.), or as the verse is rendered by Longfellow —

> The shade of him
> Who made through cowardice the great refusal.

But as has been well remarked, "Dante knew better than to consign a man to eternal pain for having declined the path of ambition." Celestine V's day in the Roman calendar is 19 May, but he is there styled not simply Saint Celes-

tine, but Saint Peter Celestine (Petrus Cœlestinus). See CELESTINES.

CELESTINES, a monastic order of the Roman Catholic Church, a branch of the great Benedictine order. It was founded by Pietro di Morone, afterward Pope Celestine V (q.v.). To Pietro di Morone, who was leading an eremitical life in a wilderness, so many men resorted for spiritual guidance that he was induced to form them into a religious community under a rule drawn up by himself. The institute was approved by Pope Urban IV in 1264, 10 years after it had been founded, but not as an independent order, for it was made a branch of the Benedictines, under a rule based on the rule of that order. They wore a white garment with a black hood and scapular and lived a purely contemplative life. The mother house of the institute was on Monte Majella in the Abruzzi, and 30 years after it was affiliated to the Benedictine order its primacy was acknowledged by 36 establishments having 600 members. The founder now relinquished the office of superior-general and resumed his former eremitical life. After Pietro was made Pope Celestine, the order, till then known as Hermits of Saint Damianus and popularly as Moronites, took the name of Celestines. The order spread throughout Italy and beyond the Alps to France, Germany and Flanders; so strong was its French branch early in the 15th century that it obtained for itself from the Popes bulls that made it in a measure independent of the superior-general. But in the 17th century the order was already in process of rapid decay, and in the 18th many of its establishments were dissolved by papal decree, and many more by the secular powers. The order is now extinct.

CELESTITE, a native form of strontium sulphate, $SrSO_4$, crystallizing in the orthorhombic system, and also occurring in fibrous and radiated forms. The crystals resemble those of barite, and are usually tabular or prismatic. They have a hardness of from 3 to 3.5, and a specific gravity of 3.96. Celestite is commonly white with a vitreous lustre, but it also occurs with a pronounced bluish tinge, from which circumstance it received its name. When found in quantity it is a useful source of strontium. Fine crystals of it occur in the limestone about Lake Erie. Other important localities are in Sicily, Hungary, England, Canada, West Virginia and California. Varieties containing large amounts of calcium or of barium are called calciocelestite and barytocelestite respectively; and the mineral itself is often called celestine.

CELIBACY, the state of being unmarried; especially the voluntary single life undertaken by religious devotees and by some clerical orders, as those of the Roman Catholic Church. Paul (1 Cor. vii) recommends virginity, without condemning matrimony. The Roman Catholic Church respects matrimonial chastity, but esteems virginity a higher virtue.

From the time of the apostles it became a custom in the Church for bishops, priests and deacons to renounce matrimony at their consecration, and to devote themselves entirely to the duties of their office. One point only was disputed, whether clergymen were to be merely prohibited from marrying, or whether even those who were married before their consecration should be required to separate themselves from their wives. At the Council of Nice several bishops proposed that the bishops, priests and deacons who had received the holy consecration should be directed by an express ordinance to give up their wives. But Paphnutius, bishop of Upper Thebais, contended that cohabitation with a wife was a state of chastity. It was sufficient, he said, according to the ancient traditions of the Church, that men in sacred orders should not be permitted to marry; but he who had been married before his consecration ought not to be separated from his lawful wife. As it became the general opinion that a clergyman could not marry, it soon became the general practice to refuse consecration to married men. By this means uniformity was effected. As for the bishops, it soon became a matter beyond dispute. When monachism had become firmly established, and the monks were regarded with veneration on account of their vow of perpetual chastity, public opinion exacted from the secular clergy the same observance of celibacy. Epiphanius assures us that by the ecclesiastical laws celibacy was commanded, and that wherever this command was neglected it was a corruption of the Church. The Council of Elvira (305) commanded all bishops, presbyters, deacons and subdeacons to abstain from their wives, under penalty of exclusion from the clergy. In the Western Church celibacy was rigorously required. Pope Siricius, at the end of the 4th century, forbade the clergy to marry, or to cohabit with their wives if already married. At the same time the monks received consecration, which increased the conformity between them and the secular clergy still further, and indirectly obliged the latter to observe celibacy. The Emperor Justinian declared all children of clergymen illegitimate, and incapable of any hereditary succession or inheritance. The Council of Tours, in 567, issued a decree against married monks and nuns, declaring that they should be publicly excommunicated, and their marriage formally dissolved. Seculars, deacons and subdeacons, who were found to dwell with their wives, were interdicted the exercise of spiritual functions for the course of a year. In Spain, where many priests refused to conform to the requirements of the Church, the bishops were ordered to enforce celibacy upon their abbots, deacons, etc., once a year in their sermons.

As in other points of discipline, in this also the Greek Church dissented from the Roman. The (Trullan) Council of Constantinople, in 691, in its 13th canon, declares: "We hereby forbid anyone to refuse the consecration of a priest or deacon on account of his being married, and cohabiting with his wife after he has requested consecration. We will by no means be unjust to marriage, nor separate what God has united." Celibacy is indeed required of the bishops and monks, but priests and deacons, if married before ordination, are allowed to continue in this state. The Russian Church modified the ancient Greek canons by permitting priests and deacons to marry after ordination.

The Roman Catholic Church, then, has retained celibacy as an old apostolical tradition, to which she has added the rule not to conse-

crate married men unless the wife enter a religious order. As no one has a right to demand to be consecrated a priest, the Roman Church has, by this addition, violated no one's right. Her position, therefore, is expressed by saying that, profoundly convinced that an unmarried clergy is best suited to her work, she admits to her ministry only those who voluntarily engage to lead a celibate life, and as long as she finds a sufficient number of such candidates she refuses to hamper her work by the employment of others. While, however, the Church persevered in commanding celibacy, she had to struggle with the opposition of those who among the clergy represented corruption. A reformer appeared in Gregory VII, who in order to reform the discipline of the Church, was obliged to encounter simony and licentiousness in some of the clergy. The former he checked by opposing the Emperor's right of investiture, and he enforced the laws of celibacy by new regulations. In the Council of 1074, at Rome, he ordered that all married clergymen and all laymen who should confess to them, hear mass of them or be present at any divine service performed by them, should be excommunicated. This met with much opposition, but in spite of that, Gregory succeeded, as he was supported by the most ancient and most undoubted canons. After Gregory's death the Church continued in the same course. Still the question of celibacy has continued down to recent times to be the subject of fresh agitations and contests. All through the first half of the 19th century there were periodical attacks upon this rule of the Church, in which almost every Catholic country of Europe was represented. These movements have occurred alike within the communion of the Church and among secular and political bodies. They have usually been inspired by concern for the welfare of the Church and for the character and perpetuity of its priesthood, but no result has thereby been gained in any alteration of the ecclesiastical discipline.

The rule of celibacy has been more strictly observed in the Roman Catholic Church since the Reformation than it was before. The far greater number of the Catholic clergy have continued to respect it. Among the reasons sometimes urged against requiring celibacy in the clergy is the scarcity of men willing to devote themselves to a profession which calls for such strict self-denial. This, however, is said to be not true in point of fact, since statistics show a marked increase in the number of candidates for the priesthood at the present time. Among the United Greeks, Ruthenians, Copts, Maronites and other Oriental rites in communion with Rome, the discipline is that bishops cannot, after consecration, either marry again or cohabit with the wife married before ordination. Priests and deacons may keep the wives taken before ordination, but must abstain from marital intercourse for some time before officiating at the altar. Priests and deacons cannot marry after ordination. Converts from schism already in orders are allowed to keep the wives taken after ordination. Celibacy is purely a disciplinary law, and has no doctrinal bearing whatever. Dispensations from celibacy have been granted in exceptional cases, notably that of John Casimir, who had been elected King of Poland, and was released from celibacy in order to preserve the succession in 1648. Consult Carry, 'Le célibat ecclesiastique devant l'histoire et devant la conscience' (Paris 1905); Lea, 'Historical Sketch of Sacerdotal Celibacy' (Philadelphia 1886); Schmitt, 'Der Priester-cölibat' (Münster 1870).

CELINA, Ohio, city and county-seat of Mercer County, 25 miles southwest of Lima, on the Lake Erie and Western, the Cincinnati Northern and the C. N. and D. railroads. It has manufactories of furniture, acids, buggies, a creamery and two banks. The value of its taxable property is placed at $4,983,720. It has two public and one parochial school and a Carnegie library. Pop. 4,000.

CELL. The cell is the unit of life. The name was given by Robert Hooke, an English architect, who discovered the cellular structure of plants while examining charcoal and cork. In such objects all living contents have disappeared; so the name, cell, was applied to the honeycomb-like chambers. During the last half of the 17th century, Robert Hooke and Nehemiah Grew published extensive researches upon the cellular structure of plants; while the Italian physician, Malpighi, and Leeuwenhoek, a Dutchman, published similar investigations upon animals. The entire 18th century, with Linnæus as the dominant figure, was so devoted to the classification of plants that scarcely any microscopic work was done. The prevailingly small size of cells, together with the imperfections of the early microscopes, made investigations difficult. Most cells are too small to be seen by the naked eye. Some cells are not more than one *micron* (one-thousandth of a millimeter, or one-twenty-five-thousandth of an inch) in diameter. The cells which the earlier observers described were generally 10 microns or more in diameter. In plants, a cell 100 microns in diameter is very large. The internodal cells of Chara, the Stonewort which grows in ponds, sometimes reach a length of three or four inches. The eggs of birds, before fertilization, are unicellular. They are the largest cells known. The egg, when it is laid, contains an embryo and so is already a multicellular structure.

The beginning of the 19th century saw a vigorous resumption of microscopic investigation, coupled with great improvements in the microscope. In 1838 Schleiden announced his theory that the entire plant consists of cells. This theory, now an undisputed fact, is called the Cell Theory. In the next year, Schwann declared that the entire body of even the most complex animal was built up of cells. While the Cell Theory was soon recognized as a fact, the development of tissues and organs from cells, and the growth, differentiation and multiplication of cells furnished subjects for research during the rest of the century. Many fundamental problems along these lines still remain unsolved, but the improved microscopes, together with improved methods, gave better views of the cell contents and it was soon recognized that the contents are even more important than the cell wall.

The principal contents are the protoplasm and the nucleus. The nucleus was discovered and named by Robert Brown in 1831; the term, protoplasm, was first used by Purkinji in 1840

to designate the entire body of young embryos. In 1846, von Mohl applied the term to the living contents of the cell, so that it is synonymous with the term, protoplast, as we use it to-day. Most writers now restrict the term still further, applying it to the living contents of the cell, exclusive of the nucleus. In this sense, it is synonymous with cytoplasm. All cells of both animals and plants, with the barely possible exception of bacteria, have both nucleus and cytoplasm; but many cells, both in animals and plants, lack the cell wall.

Besides the nucleus and cytoplasm there are other cell contents which may or may not be present. In the early nineties many believed that the *centrosome* was a constant and essential organ of the cell. This organ attains its highest development in animals, particularly during the formation of the polar bodies; but it must now be admitted that in many animal cells no centrosomes can be demonstrated. In plants, there are genuine centrosomes in many of the algæ and fungi; some investigators still claim to have demonstrated centrosomes in the liverworts, mosses and ferns; but all now admit that there are no centrosomes in the flowering plants. However, in the liverworts, mosses, ferns, Cycads and Ginkgo, during the formation of sperms, a centrosome-like body, called the blepharoplast, is very conspicuous. It is probably a genuine centrosome. In most Gymnosperms even this blepharoplast has disappeared and there is no trace of it in the Angiosperms. Plant cells may contain plastids, starch, chlorophyll and other pigments, oil, crystals, mucilage, resin,

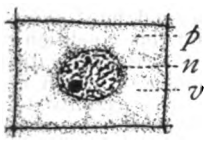

Fig. 1

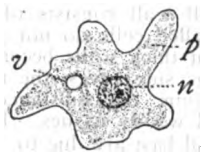

Fig. 2

Fig. 1, drawn from the root tip of an onion shows plant cell with a wall. Fig. 2, Amœba, a unicellular animal, shows a cell without a wall. *n*, nucleus; *p*, protoplasm; *v*, vacuole. Highly magnified.

etc. These, however, are of only secondary importance, as they are formed under the influence of the living protoplasm. Animal cells contain an equally great variety of substances.

Cells of the wood and the bast are easily recognized as plant cells, while muscle and nerve cells are just as characteristically animal; but the similarity of the cells of animals and plants, especially in their younger stages, is so great that it easily leads to speculation. In both, the mass of protoplasm and the nucleus are the essential features. In its ultimate structure, the protoplasm of animals and plants seems to be essentially identical, although the characteristic vacuoles of plants are inconspicuous or lacking in animals and some of the products of protoplasm are different in the two kingdoms. The nuclei of animals and plants are so identical that in multitudes of cases, even an expert could not say whether a given nucleus belongs to an animal or to a plant. Both have a nuclear membrane, nuclear sap, a nucleolus and chromatin. In both, during division, the chromatin breaks up into a definite number of pieces, called chromosomes, each of which splits longitudinally, and one-half passes to each of the two nuclei formed by the division.

This division of the nucleus and cell to form two new nuclei and cells is one of the most familiar and, at the same time, most complicated phenomena of biology. The essential features of an ordinary division in a vegetative cell are shown in Fig. 3, *A-F*. The

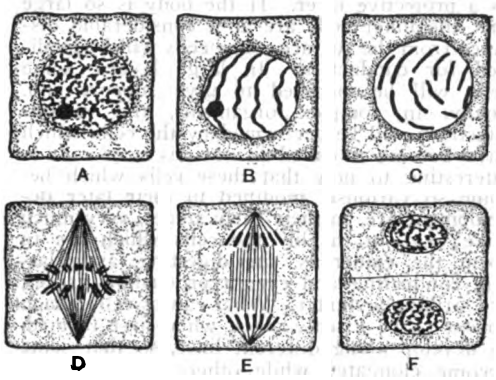

Fig. 3

chromatin of the resting nucleus (*A*) forms a more or less continuous thread, called the *spirem* (*B*); the spirem segments into a definite number of pieces called chromosomes (*C*), the number being constant for any given species. Each chromosome splits longitudinally into two pieces, forming two new chromosomes (*D*). The new groups of chromosomes separate (*E*) and form two new nuclei, while a new cell wall develops between them (*F*). This whole process of division, formerly called karyokinesis, is now more generally called *mitosis*. Preceding the formation of eggs and sperms, there are two peculiar divisions, called the reduction divisions, which reduce the number of chromosomes to one-half the number characterizing the vegetative nuclei. This reduction of chromosomes is found in all animals and plants which have reached the level of sexuality. The fusion of the egg and sperm at fertilization restores the number. In both animals and plants, it is becoming recognized that the chromosomes are the physical basis of heredity.

The lowest animals and plants are unicellular and, since animals are either immediately or ultimately dependent upon plants, it follows that unicellular plants were the first forms of life. The single cell performs all the functions, ingestion, digestion, assimilation, excretion, respiration, reproduction, etc. The diversity of form attained by these unicellular organisms is amazing.

The first step in the evolution of the plant body was attained when, after the division of a cell, the two resulting cells failed to separate. Continued division of this sort results in the formation of a filament, either simple or branched, but still consisting of a single row of cells. The next step is attained when divisions take place in two directions, so that, instead of a filament, a flat plate, one cell in thickness, is built up. In the filaments and in such thin plates there is little or no differentiation among the vegetative cells, except that

some may be more or less modified as holdfasts to attach the plant to a substratum; but in both there may be considerable differentiation of reproductive cells. When divisions occur in three directions, more or less massive bodies are built up and the division of labor is accompanied by extreme differentiation among the various cells. Even in rather small bodies, the outer layer of cells is likely to be modified as a protective layer. If the body is so large that the inner cells are at a considerable distance from the surface, some cells will be modified for conduction. In large bodies, some cells will be modified to give support and, finally, in complex organisms, the various functions will be performed by the cells which have become modified in various ways. It is interesting to note that these cells which become so variously modified in their later development are, in their early stages, very much alike; e.g., in the lily the cells which are to form the epidermis, the digesting, assimilating, conducting and even reproductive tissues, are strikingly similar. What causes cells which appear to be exactly alike, when first formed, to develop along different lines, so that some become elongated while others remain short,

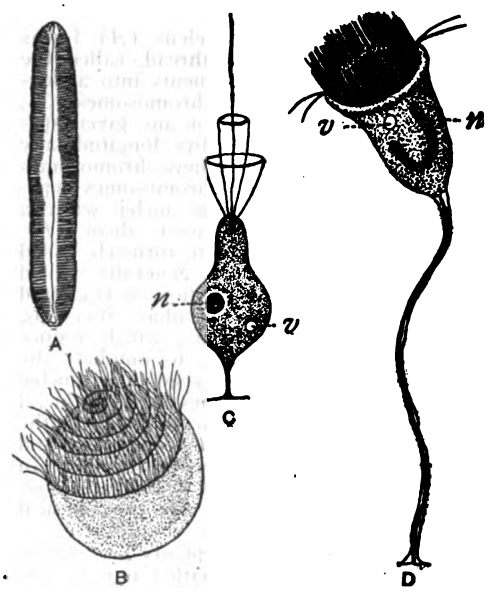

Fig. 4, Unicellular organisms. *A* and *B*, plants; *C*, animal or plant; *D*, animal. *A*, a Diatom, Pinnularia; *B*, sperm of a Cycad, Stangeria; *C*, a Flagellate, Diplosiga, studied and described by both botanists and zoologists; *D*, an Infusorian, Vorticella. All highly magnified.

some become thick walled while others remain thin walled, some function in digestion, others in conduction, etc., is still an unsolved problem. The egg cells of the oak, the lily and the sunflower are almost indistinguishably similar and the early stages in the development of their embryos are not very different. What determines the development is a great problem still unsolved. To say that heredity is the cause merely gives a name to the difficulty.

In multicellular plants it seldom happens that cell division takes place uniformly throughout the whole organism. On the contrary, there are definite embryonic regions where new cells are formed by division. These regions are called "growing points," a very inaccurate name, since they are dividing regions, the growth taking place after division has been completed. There are two principal methods of building up a body: in one, there is a dominant apical cell from which segments are cut off, the repeated division of which gives rise to the whole body; in the other, there is a

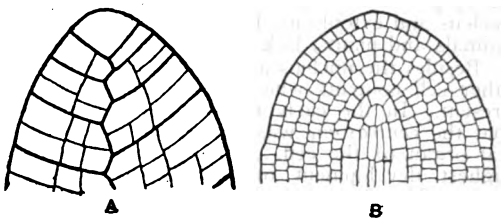

Fig. 5, *A*, body built up by the continued division of a single apical cell; *B*, body built up by the division of a group of embryonic cells.

group of embryonic cells (meristem), all of which divide, there being no single, dominant cell. The first type, with the single apical cell, is found in many algæ, all liverworts and mosses and the ferns; the second type is found in lycopods and all the flowering plants.

Beyond the dividing region, cells grow and differentiate. Cells which are to form the conducting system elongate and secondary thickenings of their walls produce the spirals, rings, nets, pits and various markings, all of which are formed by material deposited on the inner surface of the original wall. The young cell wall consists of *cellulose* and most thin-walled cells do not get beyond this condition; but thick walls become impregnated with various substances, the most common of which is *lignin,* the substance which gives rigidity to all woody tissues. The characteristics of cork and bast are due to *suberin;* the rigidity of the stems of wheat and oats is due to *silica;* and there are various other constitutents of adult cell walls.

The duration of the life of a cell is various. Some cells live only a few hours, some a few days, some live for a season and others live for years. A big tree, thousands of years old, consists almost entirely of dead cells, the life of the individual cell being comparatively brief, perhaps only a few years. The spores of the water fern, *Marsilia,* have germinated after resting for 50 years. Many seeds retain their power of germination for 20 or 30 years, some for 100 years and a few may germinate after 150 years. Tales of the germination of seeds from ancient Egyptian burial places are entirely without foundation. Seeds of corn, wheat and oats live only a few years. Since there is no cell division during the dormant period of the seed, the individual cell lives throughout this period, however long the period may be.

In Darwin's time, the great problems of biology were studied in the gross; but during the last quarter of the century there was an increasing tendency to study, both in plants and animals, the individual cell as the unit of structure and behavior. At present, the great problems of structure, development, physiology, evolution and heredity are becoming recog-

nized as cell problems and the increasing attention now devoted to cell studies promises to answer some of the most difficult questions of biology. (See PLANTS, ANATOMY OF; BLEPHAROPLAST; CYCADS; CYTOLOGY; HYBRIDS IN PLANTS; PLANTS, MORPHOLOGICAL EVOLUTION OF; PLANTS, RECAPITULATION IN; PLANTS, SEX IN; PLANTS, VASCULAR ANATOMY OF). Consult Hertwig, O., 'The Cell'; Wilson, E. B., 'The Cell in Development and Inheritance.'

CHARLES J. CHAMBERLAIN,
Professor of Morphology and Cytology, University of Chicago.

CELL, a small chamber; the dwelling of a hermit; a lesser or subordinate religious house dependent upon a greater, by which it was erected, and under whose government it remained. The apartments or private dormitories of monks and nuns are also called cells. In early Christian usage, the word was also applied to a chapel erected over a tomb.

CELL, in mechanics. See PEAUCELLIER CELL.

CELL, Electrical. See BATTERY.

CELLA, the windowless hall or central apartment of a Greek or Græco-Roman temple. This was often divided into two chambers of unequal size; the naos, in which was the statue of the divinity for whose worship the temple was built, and the thesauros or treasury. The cella was formerly supposed to have been roofless, or partially roofless, but later scholars believe it to have been lighted only through the doors or by artificial light. In the larger temples the roof was internally supported by the rows of columns in the cella, frequently in two superposed ranges.

CELLAMARE, thāl-yā-mā'rā, **Antonio Giudice,** PRINCE OF, Spanish Ambassador: b. Naples 1675; d. Seville, 16 May 1733. He was educated at the court of Charles II of Spain, and took a prominent part on the Spanish side in the War of Succession. In 1707 he was taken prisoner by the Imperialists, and detained five years in Milan. On obtaining his liberty he returned to Spain, and in 1715 was appointed Ambassador Extraordinary at the French court. Here, having entered into Alberoni's scheme, he became head of a conspiracy for supplanting the regent, Philip of Orleans, and appointing Philip V regent of Spain and France. The plot was discovered and Cellamare was marched off under a guard to the Spanish frontiers. He was afterward made captain-general of Old Castile and held the office at his death. A romance of Vatout, entitled the 'Conspiracy of Cellamare,' gives an account of the conspiracy with tolerable accuracy. Consult Martens, 'Causes célèbres du droit des gens' (2d ed., Leipzig 1861).

CELLAR-SNAIL, a species of land-snail (q.v.) (*Zonites cellaris*). It has been introduced from Europe and has become common in cellars, hot-beds and gardens of the seaport towns along the Atlantic coast. The shell is small, much flattened, thin, and has a large umbilicus.

CELLE, or **ZELLE,** tsĕl'lĕ, Germany, town of Hanover province, Prussia, on the Aller River, here navigable; 24 miles by rail northeast of Hanover. Among its notable buildings are the ducal palace of the 15th century, the churches, the 16th century Rathhaus and the museum of mediæval antiquities. Celle is the seat of the Supreme Court of Hanover, and maintains an agricultural and forestry school, a gymnasium, two libraries with priceless collections of books, and other public institutions. The principal manufactures of the town are printers' ink, woolen yarn, tobacco, cigars, stearin, soap, and a busy export trade is carried on in honey, wax, wool and lumber. The annual horse races are noted. Pop. 23,300.

CELLINI, Benvenuto, chĕ-lē'nē, bān-vā-noo'-to, Italian sculptor of the Renaissance, engraver and goldsmith: b. Florence, 1 Nov. 1500; d. there, 25 Feb. 1571. It was his father's desire that his son become a musician. For this reason he spent his boyhood practising the flute, but when he became 15 years of age he was apprenticed to a goldsmith named Marcone. His hot temper soon manifested itself and led to a quarrel with some young men who had attacked his brother. He fled and wandered through Siena, Bologna and Pisa, supporting himself by plying his trade. At this period of the Renaissance the goldsmith's art was by no means a debasing profession and Benvenuto distinguished himself in it. In 1518 he returned to Florence and studied the works of Michelangelo, whom he always considered his beloved master and whose works influenced him profoundly. His reputation secured for him an invitation from Torrigiana to visit England and enter the service of Henry VIII. But having little liking for the English and less for his companion, he refused to undertake the journey. After a quarrel with his father he set out for Rome, where he remained for two years, diligently pursuing his trade. A brutal quarrel, in which he killed his enemy, caused him to leave Rome. He returned in 1523 and his extraordinary abilities secured for him the patronage of Pope Clement VII. Here he was employed in the making of various jewels, ornaments and services of plate. He served also in the Papal band. When Rome was besieged in 1527, Cellini took part in the protection of the Papal palace. His stirring account of the siege reveals his own vanity and boastfulness. He tells us that he himself shot the Constable of Bourbon and wounded the Prince of Orange. When peace was declared Cellini paid a hasty visit to Florence and assassinated the murderer of his brother. Later with a curious domestic fidelity he took upon himself the support of his sister and her children. To escape vengeance at the hands of the friends of the murdered man, Cellini took refuge in the house of the Duke of Cività di Penna and received the Pope's pardon. Free again, it was not long before a passionate quarrel with a personal enemy resulted in another murder, for which he was again pardoned. He spent the next four years at Rome, engaged in constant quarrels; and having differed seriously from the Pope, departed for France. He passed through Switzerland, stopping at Zürich, Geneva and Lyons and came eventually to Paris. He returned shortly afterward to Rome, was arrested by Paul III and thrown into prison on charge of having stolen the Pope's gold, but really because of the enmity of the bastard son of the Pope. He escaped with the greatest difficulty, breaking a leg in the attempt, and came

to the house of Cardinal Carnaro, who protected him for a time, but finally gave him back to his enemy the Pope in exchange for a bishopric. Cellini was thrown into a dungeon, where he underwent those remarkable spiritual excesses of devotion in which his enthusiastic nature found consolation and outlet. On solicitation from Francis I, he was freed and entered the service of that king. He followed him to France; immediately forgot his spiritual awakening and once more turned to his pleasure-loving existence. Francis made him a present of a castle which Cellini had to conquer by force of arms. His life in France was characterized by the same restlessness and passion. It was filled with law-suits, intrigues, violent outbursts of all sorts, which arose from a lack of ease of manner at court and his violent temper. From these embroilments he always extricated himself with Machiavellian disregard of all except private gain. He executed many minor works for Francis, among them a nymph in bronze, "a long-limbed, lifeless figure without meaning — a snuff-box ornament enlarged to a gigantic size." In a fit of temper he forsook Paris and returned to Florence and the mean-minded patronage of Cosimo di Medici. The remainder of his life was spent here, in constant quarrels with his rival Bandinelli and the Duke's steward.

In 1558 Cellini received the tonsure of the first ecclesiastical orders, which he renounced two years later and married. He died at the age of 70, leaving three legitimate children.

The great achievement of the last Florentine period was his statue Perseus, a bronze representing a beautiful and perfectly molded, but entirely expressionless youth, carrying the head of Medusa. In the niches of its base are small figures of gods, which in their absolute perfection of detail are unequalled anywhere; and a relief of 'Perseus Rescuing Andromeda,' the original of which is now in the Bargello. The statue was completed in 1554 and was unveiled in the Loggia dei Lauzi at Florence, where it now stands. He enjoyed lavish praise for this marvelously overwrought masterpiece. Other important statues are the colossal bust of Duke Cosimo I (1545–48); the bronze bust of Bindo Aldoviti (1566, Gardner collection, Boston); and the life-size 'Crucifixion,' intended for his own tomb. But it was in the art of the goldsmith that Cellini excelled. Unfortunately few of these works survive. Among the most notable that have come down to us are the saltcellar of Francis I (now in the museum at Vienna). It is embossed in gold and enamel, and ornamented with figures of Neptune and Cybele in high relief. Many very beautiful works in the museums of modern collectors have been ascribed to him — among them two cups in the J. P. Morgan and the Altman collections. The gold cope button of Clement VII, set with precious stones, including the second largest diamond in the world; the medals representing 'Hercules and the Nemean Lion,' 'Atlas Supporting the Sphere' in chased gold, and medals of Clement VII and Francis I are among the remnants of his exquisite workmanship.

His fame rests largely on his autobiography, a brilliant work, teeming with his loves and hates and the kalcidoscopic adventures of his restless career. Cellini is chiefly interesting not only as an artist, but also as a mirror of his times. He reflects an Italy, brilliant, superstitious, cruel and sensual. His contemporaries accepted his arrogance, his disregard of the value of human life, his selfishness and vindictiveness as the rightful attributes of a great man. Law was a matter then for private justification. Religion belonged to the ascetic, or was appealed to when human agency failed. In his works, so flawless in technique and so devoid of spiritual and moral inspiration, one sees Rome's worship of mere physical perfection, her love of luxury and her loss of soul. The autobiography, written in his old age, gives intimate and vivid touches of the political history of the time and the personalities who throng its pages.

In addition he wrote a treatise on the art of the goldsmith and on sculpture (1568), of which a modern edition was published by Milanesi (Florence 1857). His works were published at Florence in 1843. See CELLINI'S AUTOBIOGRAPHY.

Bibliography.— The best Italian edition of his 'Autobiography' is by Bacci (Florence 1900); English translation by Symonds (London 1896); by Cust (2 vols., 1910). Goethe rendered a very admirable translation into German. The classic monograph is by Plon (Paris 1882–84); others are by Focillon, in 'Les grandes artistes'; Serpino (Florence 1904); Torelli (1903); De Bouchard (Paris 1903); Gailly de Taurines (1908); Heiss (Paris 1887); Friedländer (Berlin 1880–82). Consult also Symonds, 'The Renaissance in Italy' (Vol. III, 1885); Leader Scott, 'Sculpture, Renaissance and Modern' (1886).

CELLINI'S AUTOBIOGRAPHY. English readers are fortunate in that the translation by John Addington Symonds has made the 'Autobiography of Benvenuto Cellini' (1500–71) a piece of English literature. The translation is prefaced by an admirable critical introduction, to which the student is referred for all questions of text and historical setting. We learn that the book has been valued by such a mind as Goethe's, who translated it into German; by Horace Walpole, who found it "more amusing than any novel," and by Auguste Comte, who placed it upon his list of necessary works. In the opening sentences Cellini states his opinion "that all men . . . who have done anything of excellence . . . ought, if they are persons of truth and honesty, to describe their life with their own hand." He stands before us painted in vivid colors, the typical artist-soldier of the Renaissance, vain and violent, industrious and energetic, sensitive to beauty if not to goodness, often the bully and braggart, but always the exquisite and indefatigable artist. One is interested to note the contrast between his character and his art — the latter, in such pieces as remain to us, appears florid, elaborated, sophisticated; while the former, in its grim lines, seems to be the exact reverse. "A terrible man!" someone termed him, and Cellini records the phrase with pleasure, liking to be thought formidable. But at least we feel him to be as honest a craftsman on paper as on his forge; he has wrought his own strange shape with the same amount of care and candor as he gave to the Pope's gold button. His story is full of vitality. When he struggles to cast his bronze Perseus and is

successful, we rejoice in his triumph. We dwell with him in the violent Italy of his day, following the jests of his rowdy supper-parties, his brawls, duels and escapes, his journeys into France, his encounters with those kings, Popes and dukes who roused him to such impatience. His careless amours, his candid vices, his fears and superstitions, his illnesses and recoveries, his injuries and revenges, are all told with the quality of life; and the same vividness lies in his incessant grumbling at his bad luck, in his rough and savage humor, his quarrels with Vasari and Bandinelli, his hearty admiration for Michelangelo. Great persons pass across his pages — Cosimo di Medici, Lorenzino, Francis I of France. What turbulent vigor in the episode of the bronze Perseus, or in that of his return to find his family dead in plague-stricken Florence! Such incidents as those of the necromancer raising devils in the Coliseum, or of the mad castellan, who fancied himself a bat, are unforgettable etchings; while the effect of the whole book is to revive for us a period in the world's history which has incalculable interest for the dissimilar world of to-day.

ANNA ROBESON BURR.

CELLITES, or ALEXIAN BROTHERS, a religious order, so called from their patron saint Alexius, and from *cella,* tomb, from the fact that their life often leads to an early grave. The brotherhood arose in Mechlin about 1300 to check the ravages of the "black death," and soon spread through Germany, Brabant and Flanders. At first the Cellites were merely a pious society, intended to harbor the poor and indigent free of charge, to serve the sick and bury the dead. In 1469 they were organized as a religious order, and, favored by the Popes, they established houses in many parts of Europe. In the United States, they have a hospital in each of the following cities: Chicago (founded in 1861); Saint Louis (1869); Oshkosh, Wis. (1880), and Elizabeth, N. J. (1893). They have asylums and hospitals in England, Germany, and Belgium likewise. Consult Steele, 'Monasteries and Religious Houses of Great Britain and Ireland' (London 1903, 1910–13); and 'A Brief History of the Alexian Brothers' (Chicago).

CELLULOID, an artificial substance invented in its modern form by the brothers Hyatt of Newark, N. J., in 1869 (U. S. Letters Patent No. 88,634) extensively used as a substitute for ivory, bone, hard rubber, coral, etc., having a close resemblance to these substances in hardness, elasticity and finish. It is composed of the lower nitrates of cellulose, gelatinized in a solution of camphor in methyl or ethyl alcohol. The nitrates of cellulose are usually prepared by subjecting tissue paper to the action of a bath of mixed nitric and sulphuric acids for 20 minutes at a temperature of at least 30° C. The resulting substance is dried by blotting or by the use of alcohol, and incorporated by heat or mixture with alcohol, camphor and any pigments or fillers that may be used. The dough-like mass then resulting is worked into form by various means, and these seasoned by being kept from one to six weeks at 30° C. to evaporate the alcohol. Urea is often added as a stabilizer, and various sorts of dyes or pigments may be used. Celluloid is plastic at 75°. It is very inflammable. It is used for films for cameras and moving pictures, but on account of its excessive inflammability is coming to be replaced by preparations of the acetic-acid ester of cellulose. Celluloid varnishes for lacquering on metal are prepared from various pyroxylin preparations and pigments. Consult Bockman, 'Celluloid' (London 1907); Ertet, 'Die Celluloid Industrie' (1909); Lehner, 'Imitationen' (Vienna and Leipzig 1907); Martin, 'Industrial and Manufacturing Chemistry — Organic' (New York 1913); Masselon, Roberts, Ellard, 'Le celluloid' (Paris 1910; translated 1912); Worden, 'Nitrocellulose Industry' (London 1911).

CELLULOSE, a chemical substance closely allied to starch, which occurs in all plants, where its compounds form essential constituents of the walls of the cells. It is especially prominent in young plants, and with age it becomes more or less completely converted into lignin and other analogous products. Cellulose can be readily digested and absorbed by herbivorous animals, but only to a slight extent by man. Cotton fibres are composed almost entirely of cellulose, and such other substances as they do contain are readily removed by treatment with alkalis, alcohol, ether, etc. Wood and all textile fibres are mostly compounds of cellulose. Cellulose has the chemical formula n ($C_6H_{10}O_5$), and is therefore a carbohydrate. In some respects, it is widely different from starch, but in others it resembles starch very closely. It may be said in general that the chemistry of all the substances that are intimately related to the starches, gums and sugars is still very imperfectly known. Cellulose is specially remarkable for its insolubility and its chemical stability. It may be decomposed and caused to enter into combination with other bodies, but the only solvent known, which will dissolve it without destroying its chemical identity, is an ammoniacal solution of cupric oxide. From its solution in this menstruum, cellulose may be again precipitated in apparently unchanged chemical form, though in a physically amorphous condition. Unglazed paper (which is nearly pure cellulose) is converted, by the action of strong sulphuric acid, into a parchment-like substance that is known as vegetable parchment, or parchment paper. By the action of a mixture of strong nitric and sulphuric acids, cellulose is converted into nitrates, the higher ones of which are commercially known as gun-cotton (q.v.). Collodion (q.v.) is a solution of the lower nitrates in a mixture of ether and alcohol. Celluloid (q.v.) is a mixture of the lower nitrocelluloses with camphor. Acetates of cellulose are formed by treatment with acetyl chloride, and are often used as substitutes for celluloid, being less inflammable, and as insulating films. Formates are also used in this way. Xanthogenates of cellulose are used in the production of certain forms of artificial silk, leather and wood. Alkalis react with cellulose, causing it to contract (see MERCERIZED COTTON). By the prolonged action of sulphuric acid cellulose is partially converted into glucose, and various other reactions are also known with sulphuric acid according to the conditions under which the experiment is made. When strongly heated out of contact with the air cellulose is destroyed, with the formation

of acetic acid, methyl alcohol and many other products. These transformations occur in the distillation of wood in the manufacture of wood alcohol. (See ALCOHOL). It is probable that true cellulose occurs only in plants; but a substance that is closely analogous to it, and which is believed by some authorities to be identical with it, is found in the tissues of ascidia.

Cellulose as prepared from corn pith has been used to a considerable extent in ships of war, to prevent the entrance of water through shot-holes. For this purpose it is disposed within the steel hull along the water line, in the form of a belt some three feet in thickness. For several years a packing of cocoa fibre was used in this way, but corn pith is now preferred, because as soon as the water reaches it the pith swells and automatically closes the shot-hole. Consult Bersch, 'Cellulose' (Philadelphia 1904); Cross and Bevan, 'Cellulose' (London 1895); 'Researches on Cellulose' (ib. 1901, 1906, 1912); Cross, Bevan and Sindall, 'Wood-pulp and Its Uses' (ib. 1911); Worden, 'Nitrocellulose Industry' (ib. 1911); Schwalbe, 'Die Chemie der Cellulose' (Berlin 1911).

CELMA, a Thessalian woman, who, with her husband, Celmus, was changed into adamant for denying the immortality of Jupiter.

CELMAN, Miguel Juarez. See JUAREZ, CELMAN.

CELSIUS, sĕl'sĭŭs, the name of a Swedish family, several members of which attained celebrity in science and literature: 1. MAGNUS CELSIUS: b. in the old province of Helsingland 1621; d. 1679. He became professor of mathematics in the University of Upsala and published two works on the antiquities of his native province and was the discoverer of the Helsing runes. Besides mathematics and archæology, he cultivated poetry with some success, and was so skilled in practical mechanics that he himself made all the scientific instruments he required in his astronomical observations, etc. 2. His son, NILS CELSIUS: b. 1658; d. 1724; also filled the mathematical chair in Upsala University. 3. OLAF CELSIUS, another son of Magnus: b. 1670; d. 1756. He early became famous as an earnest student of the Oriental languages and of botany. He was successively appointed to the chairs of Greek, Oriental languages and theology, and filled the office of provost of the cathedral at Upsala. He devoted a good deal of attention to the study of runology and was among the first to recognize the genius of Linnæus, whom he liberally patronized. In 1745–47 he published his voluminous work, 'Hierobotanicon,' a description of all the plants mentioned in the Bible. 4. ANDERS CELSIUS, son of Nils Celsius, and the most distinguished of the family; b. 27 Nov. 1701; d. 1744. After being appointed professor of astronomy at the University of Upsala, he traveled in Germany, England, France and Italy. At his instigation the observatory at Upsala was built, and he became its first director. In 1736 he took part in the famous expedition that was undertaken by Maupertuis, Clairaut, Camus and others for the purpose of measuring a degree of the meridian in Lapland. For his services in this expedition he received a pension from the French king. He is best known at the present day as the constructor of the Centigrade thermometer. He urged the adoption of the Gregorian calendar. He published 'De observationibus pro figura Telluris' (1738). 5. OLAF CELSIUS the younger, son of the Orientalist and naturalist, and cousin of the preceding: b. 1716; d. 1794. He became bishop of Lund, and devoted himself to history and poetry. His principal historical works are 'Ecclesiastical History of the Kingdom of Sweden'; 'History of Gustavus I'; 'History of Erik XIV.'

CELSIUS SCALE, the Centigrade thermometric scale. The name is from that of the inventor, Anders Celsius, who about 1741 attempted the precise graduation of thermometers. He took the melting-point of ice at 0°; and the boiling-point of water, under standard atmospheric pressure, as 100°. See THERMOMETER.

CELSUS, pagan philosopher, an antagonist of the Christian religion in the 2d century. He is believed to have been the same Celsus, friend of Lucian, to whom is inscribed Lucian's satirical sketch of the life of the noted impostor and pseudo-thaumaturgus Alexander of Abonotichus, entitled 'Pseudomantis.' No work of Celsus has come down to us in its integrity or in its original form, but his 'True Discourse' is in substance preserved for us in the eight books of Origen's computation of the arguments brought by Celsus against the truth of the religion of Christ. It was written at Rome in the latter part of the 2d century. Origen quotes textually long passages from the 'True Discourse' in his work 'Against Celsus.' From these passages it is seen that Celsus had accurate knowledge of the religious creed and practices, both of the Jews and Christians, and he skilfully puts in the mouth of a Jew his criticism of the life of Jesus as told in the Gospels. Celsus himself appears to have been an epicurean and a scoffer at the supernatural, while his Jew is a firm believer in miracle, but for all that he cannot accept the Gospel stories. He rejects the doctrine of the Incarnation of God, and reports a scandalous story of an amour which he offers as a substitute for the evangelists' narrative; and the fact Origen quotes the passage containing this shockingly blasphemous suggestion (as it must have been regarded by him) is evidence that the Christian polemist is dealing fairly with his antagonist. According to Celsus, Jesus once visited Egypt and there learned the art of the jugglers; in his own country he easily won reputation as a wonder-worker, even a god. By his jugglery he might have made the multitude present at his immersion by John in Jordan believe that they heard a voice from heaven. If he was God, he would have made a better choice of apostles: why did he choose Judas? The story of the resurrection is self-contradictory. His death by crucifixion is undisputed and was a fact of public notoriety; if he rose from the dead, why did he not make the fact equally notorious and public? With such objections Celsus attacks the Christian faith in the first half of his work; in the second half he speaks in the person of a Grecian philosopher. Whatever is true and good in the Christian system exists already in the schools of philosophy; therefore, let the Christians abandon their narrow sectarianism and separatism and combine with all good and wise men in upholding the principles of good

government. Celsus then advances philosophical arguments against the credibility of the Christian mysteries, in particular the Incarnation. God cannot assume a mortal body either in reality or in appearance only: not really, for that would be contrary to his nature; not in appearance, for that would be a fraud. But the idea of an incarnation of God is absurd: what could be gained by an incarnation? Certainly no advantage for God; but neither for men: do men know God better for seeing him in bodily form? Did God a little while ago waken from sleep and resolve to save a few men from sin, leaving the mass of mankind to go down to hell? In his closing appeal he makes overtures for peace with the Christians, urging them to be good citizens and to retain their own private beliefs if they like, but to conform outwardly to the state religion. Consult Pélagaud, 'Étude sur Celse'; Moeller, W., 'History of the Christian Church' (Vol. I, pp. 169ff); Harnack, A., 'Expansion of Christianity' (Vol. II, 129 ff); Froude, J. A., 'Short Stories' (No. 4).

CELSUS, Aurelius, or **AULUS CORNELIUS,** Latin writer on medicine who lived, probably, under the reigns of Augustus and Tiberius. He has been called the Roman Hippocrates, because he imitated the Greek physician, and introduced the Hippocratic system into Rome. He also wrote on rhetoric, the art of war and agriculture. He is, however, best known as a medical writer. His style is elegant, and, though concise, is very perspicuous. His work on medicine is an inexhaustible source from which other authors have drawn materials. Eighty editions of his eight books 'De Medicina' have appeared; the first at Florence (1478). There is an English translation by Grieve (1756, 3d ed., Edinburgh 1837), and an edition, Latin and English, by Lee (1831). The edition by Védrènes (Paris 1876) contains a French translation. The standard text is that of Daremberg (Leipzig 1859).

CELTIBERI, a people of ancient Spain, supposed to have arisen from a union of the aborigines, the Iberians, and their Celtic invaders. Various limits have been assigned to their country, which included probably all the north of Spain as far south as the sources of the Guadalquivir. They were divided into four tribes and were of the bravest and best of all the peoples of the peninsula. They excelled equally in cavalry and infantry. Hannibal subdued the Celtiberi, and they afterward passed under the Roman yoke. They revolted in 181 B.C., and were subdued by Tiberius Gracchus 179 B.C. Two struggles for independence followed, called respectively the first Celtiberian Numantine, and the second Celtiberian or Sertorian wars, in the latter of which they were finally vanquished, and after 72 B.C. do not again appear in history.

CELTIC CHURCH, kĕl'tik, the name applied to the Christian Church in Great Britain and Ireland before the mission of Augustine (597) and which for some time thereafter maintained its independence by the side of the new Anglo-Roman Church. In Britain, the origin of the Christian Church remains in obscurity. There are sufficient records, however, to prove that throughout the 4th century there was a well-organized Church in Britain which stood in constant touch with the rest of the Church, particularly in Gaul, and considered itself an active part of that body. In the 4th century, there are records of bishops, but for a hundred years after the mission of Germanus (429) nothing is heard of the Church in Britain. The Anglo-Saxon conquest drove the Britains to the mountains of the West, where, in the 6th century, Christianity again became prominent. There were several minor differences between the Roman forms. The day of Easter, according to the former, followed the Eastern calendar; and there were also divergences in the methods of administering baptism. The coming of Saint Augustine in 597 introduced the Roman form of Christianity which gradually gained precedence over and absorbed the Celtic. In 777 its ascendency was complete in Britain and South Wales. Still the Celtic Church continued farther north until 1172 when Queen Margaret introduced complete reforms.

In Ireland, there is much legendary history concerning the foundation of the Church, which indicates that Christianity was brought from Britain to Ireland as the natural result of the close intercourse between those countries. The establishment of the Church itself seems to have been an outcome of the first mighty wave of monasticism which swept from Egypt over Gaul and Britain and carried a number of half-Romanized Christians to Ireland. The first important figure in the history of the Church in Ireland is Saint Patrick (q.v.), who converted the island and was most active in preaching and founding churches. In the region now known as Scotland, Ninian, Saint Columba and their fellow apostles established institutions which were monastic and missionary in nature. From Iona (q.v.) as a centre, the movement soon embraced all of Northumbria. The Celtic Church there was finally fused with the Roman in 664; and the Scottish and Irish churches lost their individual character in the same year, from which time their histories are identical with the Roman Church. See CULDEES.

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CELTIC LANGUAGES. The Celtic languages are the most westerly representatives of the Indo-European (better called, as more clearly indicating their territorial limits, the Indo-Celtic) family of languages, all of which descend from a common origin, with a general system of sounds, roots, and construction; they

have been spoken by different branches of the Celtic peoples (q.v.) from prehistoric times to the present day. The Celtic languages are more closely related to the so-called *centum*, or western, group (Italic, Greek, Germanic) than to the *satam group* (Armenian, Albanian, Balto-Slavic, Indian, Persian). This classification may be ignored, however, as may the one which, though correct in a purely linguistic sense, divides the Celtic languages into a *K* group (Goidelic) and a *P* group (Gaulish and Brythonic), because this criterion, besides attaching overmuch importance to a single fact of consonantism, collocates two languages, one of which (Gaulish) is practically unknown, and separates two others (Goidelic and Brythonic), both of which are well known and possess many features in common. The most notable characteristics which set off the Celtic languages from the other members of the Indo-Celtic family are: (1) The fall of initial and intervocalic *p*: cf. Lat. *pater*, Old Irish, *athir*. This change, which is common to both branches of Celtic, took place before 1000 B.C. and before the Goidelic Celts separated from the Brythonic Celts and the invasion of Britain; (2) the change already referred to (viz. of *qu* to *k* and *p*), which took place after the separation and the invasion: cf. Old Irish *cóic*, Old Welsh *pimp*, "five"; (3) the change of Indo-Celtic *ē* to Celtic *ī*: cf. Lat. *vērus*, Old Irish *fír*, "true"; (4) the change of vocalic *r* and *l* to *ri* and *li*: cf. Gk. *καρδια*, Old Irish *cride*, "heart." Within the Indo-Celtic family Celtic is most closely related to the Italic dialects (including Latin), so much so as to form an Italo-Celtic linguistic unity, because of their having, *inter alia*, similar deponents and passives in *-r*, a *b* future and other tense formations in common, the suffix *-tio-* to form abstract nouns, the genitive singular of masculine and neuter *o*-stems in *ī*, and many words closely related etymologically. These two branches are therefore more closely related linguistically than, for example, the two classical languages, Latin and Greek, and must have been spoken by a people who remained united and shared the same development for a long time after they had parted from the rest. The outstanding characteristics of Celtic (besides an extreme irregularity of verbal forms and the order of words in the sentence) are (1) the variability of initial and medial consonants. Though traces of similar initial mutation are found in the most various branches of the Indo-Celtic family, it is only in Celtic that the principle developed and became a regular system. The phenomenon is to be explained by the fact that here more than in any other language closely related words are grouped into a unity which dominates the entire mechanism of the language. In fact, without these changes and the after-effects of vowels and consonants, which largely take the place of inflection, there would be no such thing as syntax in Celtic. Unschooled Irishmen, Welshmen and Bretons operate these initial mutations to express often a very delicate shade of meaning with the same sureness as their ancestors 1,500 years ago. It is most convenient to classify the Celtic languages geographically as (1) Continental (or ancient) Celtic, and (2) Insular (or mediæval and modern) Celtic. By Continental Celtic is meant the Gaulish spoken, e.g., in Gaul in Cæsar's time, in Spain and northern Italy. All we have left of it are a few inscriptions, some in the North Etruscan alphabet of the 2d century B.C., some in the Greek alphabet or in the Latin alphabet of Roman Imperial times, names of men and places in classical texts and on coins, and glosses of foreign writers. But no Gaulish literature, not even a fragment of a written text, has been preserved. From the material at hand, however, we may conclude that Celtic speech was pretty uniform in the vast territory over which the Celts held sway. Celtic survived in Gaul alongside Latin, and also among the Galatian Celts in Asia Minor, at least until the fall of the Roman empire. It was quite forgotten by the 6th century and has left only a few traces in the Romance and Germanic languages. Consequently the Celtic idiom spoken in the Armorican Peninsula (Brittany) is not a survival of the Gaulish nor, in spite of its geographical position, does it belong to Continental Celtic, but is the language carried thither by Britons who had been driven from their homes in Cornwall by the Saxons in the 5th, 6th and 7th centuries.

Each branch of the Insular Celtic comprises three languages: I. Goidelic (called Gaelic by all its speakers) comprises (a) Irish or Irish Gaelic; (b) Gaelic or Scotch Gaelic, sometimes improperly called Erse, i.e., "Irish." This dialect was brought over to Scotland since the end of the 5th century by the Scotti, i.e., "the Irish of Ireland" who gave their name to the north of Britain; and (c) Manx. Linguistically these are really nothing more than dialects of one language. Until the end of the 18th century, though spoken Irish and Gaelic had diverged to a considerable extent, there was a common literary language among them. Of all the Celtic languages Irish is by far the most important and may be regarded as the classic because of its wealth of forms and abundance of material. The transition from Old to Modern Irish is very gradual. Old Irish is the language of the period from *c.* A.D. 750 to *c.* 1100. Most of the Old Irish material has been several times published, but most completely and conveniently by Stokes and Strachan in their 'Thesaurus Palæohibernicus, (Oxford 1901–03). Middle Irish (sometimes divided into Early Middle Irish and Late Middle Irish) extends roughly from 1100 to 1500. It is the language in which the great collections of religious and profane Irish literature have come down to us, and is distinguished from Old Irish chiefly by the weakening of vowels in unaccented syllables and the reduction of flexional forms. So far the language is not the popular language but rather that of literature and remarkably uniform, in spite of the division of the country into many clans and small kingdoms and of great variations in orthography. With the beginning of the modern period (from *c.* 1500 to the present day) dialectic differences become more pronounced and it is now customary to name the Irish dialects after the provinces of the country, Connacht, Munster, Leinster, Ulster, with many subdivisions. Sister language to Irish is the Scottish Gaelic with two main (northern and southern) and many sub-dialects. Southern Scottish Gaelic is the more Irish, has better preserved the inflections and

is the form used in literature. The oldest document, 'The Book of Deer,' dates from the 11th or 12th century. Modern Gaelic has far more borrowed words than Irish, chiefly from English and Norse. Manx occupies a middle place between Irish and Scotch Gaelic. Its most noticeable feature, outwardly at least, is its peculiar and far from ideal attempt at phonetic spelling, using the signs and sounds of the English alphabet.

II. Were it not for a common vocabulary and syntax, the Brythonic group of Celtic would be separated, at least since the Christian era in Britain, by an unbridgeable gulf from the Goidelic. This cleavage is observable from the earliest monuments and is chiefly due to the following factors: (1) The different treatment of Indo-Celtic *qu*, which at a very early period became *p* in Brythonic but which in Goidelic was for a long time preserved and then, even in the oldest Irish, changed to *k* (written *c*). Gaulish agrees in making this change with Brythonic of which, rather than of Goidelic, it may be, to that extent at least, regarded as a prehistoric type. E.g., Gaulish *pempe*, "five," Old Welsh *pimp*, Breton *pemp*, Old Irish *cóic;* Old Irish, *macc*, Welsh *map*, "son." (2) The difference in the place of accent which in Goidelic (with dialectic exceptions) was and is on the first syllable but in Brythonic on the penult. This is one of the principal reasons for the profound differences which separate the declensional and conjugational systems in these two groups of languages. (3) Contact with the Romans, as a result of which many more Latin words were introduced into Britain than Ireland and the language of the former became much more simplified and "civilized" in its grammatical structure than that of the latter which remained native, wild, unspoiled and, for that reason, more interesting. Unlike the speakers of Gaelic the speakers of Brythonic have no common name for their languages. Of this group Welsh (native *Cymraeg*) is the most important. Spoken Welsh is commonly divided into four dialects, in the northwest, the northeast, the southeast and the southwest of the Principality, but with relatively slight differences. Old Welsh extends to the end of the 11th century. Middle Welsh is about synchronous with Middle Irish. Cornish (native *Brethonec*) is, since the end of the 18th century, a dead language. With Breton it forms a close group over against the Welsh. Of Breton (native *Brezonek*), sometimes called Armorican Breton, there are four main dialects: *Leonard* (spoken in Finistère and the most literary dialect), *Trégorrois, Cornouaillais* and *Vannetais*, the most distinctive.

Celtic, once spoken almost over the length and breadth of Europe, now survives only in the extreme northwest where it is subordinate to the English and the French and exists as it were by the sufferance of those two languages over which it once was mistress. Of the languages of Europe, Irish, farthest to the west, forms a pendant to the Greek, farthest to the east. Moreover these have the following in common, namely, that they have both fallen low from the place they once held as the cultural languages of Europe and that they are the only languages of Europe which ages ago produced rich literatures independent of foreign literatures. The five surviving Celtic languages are spoken in the southwest, west and northwest of Ireland, in the Hebrides, parts of the Scottish Highlands, in some fishers' huts in the Isle of Man, in most parts of Wales and in lower Brittany. Including the Celtic speakers in Australasia, Canada, the United States and other lands to which the Celts came as colonists, the Celtic languages are spoken by approximately 3,500,000 souls, of whom perhaps 1,000,000 are monoglots. Of these over 1,250,000 speak Breton; nearly 1,000,000, or about half the population, Welsh, with more than 250,000 monoglots; nearly 750,000, of whom about 28,000 speak nothing else, Irish; about 250,000, with about 25,000 monoglots, Scottish Gaelic, and about 4,500, Manx. The most marked falling off in the use of any Celtic tongue is to be seen in the case of Irish which only about 60 years ago was spoken by more than 3,000,000 persons, of whom 1,000,000 spoke only Irish. The Celtic languages are more flourishing now and receive more official and academic recognition than at any time in over a generation. Of all the countries which are at present engaged in the work of the Celtic revival, Ireland is probably the only one in which the movement embraces the whole of the national life. In Wales the literary position of the national language (largely due to the Methodist revival) is still far and away beyond that of the other Celtic countries, but for that very reason, perhaps, conscious progressive effort is less strenuous than in Ireland. The Pan-Celtic Union was organized a score of years ago to make known to the world the desire of the Celts to preserve their nationality and to develop the treasures of language, literature, art and music which they have inherited from their ancestors.

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JOSEPH DUNN,
Professor of Celtic Languages and Literatures, Catholic University of America.

CELTIC LITERATURES. We have no information as to the literature of the Gauls, if they ever had one, which is not likely, since writing was forbidden to the Druids, who were the repositories of lore and learning among the ancient Celts on the continent of Europe. If they had a national alphabet, it must have resembled the runic characters employed in north European countries. In Cæsar's time the Greek alphabet was used to some extent amongst them.

Among the insular Celts the oldest sources of the native language are Irish inscriptions written in ogham, which consist of lines horizontally or slantingly cut, and dots below and above a line made of the edge of an upright stone pillar. Of course this cumbrous method of writing was not used for literary purposes but merely to commemorate the name of the dead. There is no doubt that in Celtic countries, as elsewhere, the native tradition was originally and for ages only oral. The very earliest literature of Ireland, which dates from the period of the conversion of the country in the 4th century, is in Latin. The national literature, in Gaelic, first appears in the 8th century at the time of the foundation of the great schools and the activities of the Irish missionaries and scholars on the continent.

I. Irish Literature.—The Gaelic literature of Ireland is vast in extent and rich in quality, and in many respects it is one of the most fascinating literatures of Europe. Yet in spite of its interest and value and of the fact that "it is the oldest existing literature of any of the peoples living to the north of the Alps" such has been the neglect with which it has been treated that even to this day no satisfactory history of it has been or indeed can be written. Though the quantity of this literature that has been published is enormous, it is only a fragment in comparison with what still lies hidden in manuscript. There are thousands of unpublished Irish manuscripts of all kinds ranging from the 11th to the early 19th century, but often containing material much more ancient, and perhaps as many more have perished. These manuscripts have to be collated and the vast material edited and explained and questions of age and source settled, before anything like a complete history of Celtic literature can be written. The oldest monuments of Celtic, next to some scanty remains of Gaulish and the ogham inscriptions, are thousands of Irish glosses which date from the 8th and 9th centuries. These glosses are found between the lines or on the margins of several Latin manuscripts which are kept, for the most part, in continental libraries at Würzburg, Karlsruhe, Milan and Turin. Texts and glosses show a profound theological and grammatical training and wide reading on the part of the scribes, not only in biblical and patristic literature but also in the classics of pagan antiquity. This gloss material is of scarcely any literary value, however, and is valuable only for the history of theology and the structure of Celtic grammar. In no country did Christianity penetrate more profoundly than in the Island of Saints, and on no literature did it leave a deeper impression than on Irish. The oldest texts in the language are religious, such as the glosses to the commentaries on Saint Paul and to the Psalms, already referred to, a homily and a tractate on the Mass. Only a few of the hymns in honor of the saints of Ireland have been published. Some of these works are translations or imitations of Latin texts but most of them are genuinely Irish and include popular lives, passions and miracles of saints, pious stories and anecdotes, prophecies, prayers, homilies, hymns called *lorica*, "corselet or defense," and *amra*, "eulogies"; in a word, religious compositions of the most varied kind and of the greatest value for the history of hagiology and liturgiology and of western Christianity in general. The apocalyptic visions are a peculiarly Irish product, although some of them, those of Fursa and Tnugdal, have been preserved only in Latin. The most celebrated is attributed to Adamnan, a monk of Iona who died in the year 703. Another original creation and one of the few specimens of the comic in old Irish literature is the burlesque epic, 'The Vision of MacConglinne.' The *Félire* is a kind of long martyrology arranged in the order of

the ecclesiastical calendar. The most important is known as the Félire of Oengus. In modern times the best known religious compositions are the moral essays, 'The Three Shafts of Death' and 'The Key Shield of the Mass,' by the 17th century priest-historian, Geoffrey Keating, whose works are regarded as the model of modern Irish prose. But the scholars of early Christian Ireland, most of whom were religious, were also interested in preserving the secular literature of their country. It is to them that we owe the compilation of the great collections known as *Leabhar na hUidhre,* 'The Book of the Dun Cow,' dating from the 11th century, the Book of Leinster, dating from the 12th, the Yellow Book of Lecan, from the 15th, the *Leabhar Breac* or "Speckled Book," from the 14th, the Book of Ballymote, and other manuscripts of miscellaneous contents which, though some of them are as late as the 18th century, contain material which can be traced back without a break to the 8th or 9th century. The early non-religious literature of Ireland was in the hands of a class of trained narrators, historians or poets called *filid,* whom the kings and chieftains of Ireland supported at their courts to sing their exploits, write their annals and preserve the legal tradition. They followed a regular curriculum extending over a dozen years and were organized into classes, each rank enjoying certain privileges and monopolizing a certain number and variety of stories. Their chief, the *ollamh,* was supposed to know 250 prime tales and 100 of secondary importance.

Foremost among the tales are the epics, which for richness and originality have no equal in western Europe. Though many of them have been published, some 300 or 400, belonging to the greater or smaller cycles, still remain inedited and untranslated. They are in prose interspersed with verse and show an extraordinary perfection in the art of narration. The Irish literati arranged them under several heads, probably as an aid to the memory, such as wars, sieges, expeditions, battles, border forays, cattle-raids, exiles of heroes, great feastings and elopements. Here it will be more convenient to group them broadly according to subject and at the same time chronologically into three great cycles. The oldest and the one we know least perfectly is the Mythological Cycle, which consists chiefly of accounts of the migrations of the races or tribes who successively peopled Ireland. How far we have here merely a euphemizing of the old Celtic pantheon and how much, if any, is based on historical events, it would be impossible to say, for only a part of it has been preserved. To this group belong some wonderful tales of rebirth, among which the story of Bran, son of Febal, is the most famous. The best known of the three cycles is the Heroic, called also the Cycle of Ulster, or of the Red Branch. The tales belonging to it bring into view the warriors of Ulster and have at bottom the rivalry and conflict between that Province and the rest of Irelands, especially Connacht. Though the saga element is predominant here, the background is unquestionably historical. The events narrated are supposed to have taken place at about the beginning of the Christian era. The subjects are most often of tragic interest and many of the smaller tales served as introductions to the grandest and most epic composition of them all, the Cattle Raid of Cualnge. The outstanding characteristics of style in the Irish epic tales are movement, life, relief and realistic description. The Fenian or Ossianic Cycle points to the south of Ireland as the place of its origin. It deals with Finn MacCumaill, his son Ossīn (Ossian), and the other chieftains of the Fianna (Fenians), half soldiers, half hunters, who seem to have flourished in the 2d and 3d centuries of our era. While the two cycles previously spoken of have been handed down almost entirely in prose, the Fenian Cycle is in verse and the poems and ballads of which it is composed are on the greatest variety of subjects and almost without number. Some of these are unmistakably imitated from stories belonging to the earlier groups, and, while many of them contain nothing historical but a few proper names, there can be no doubt of the existence of their principal characters. The most extensive text, and at the same time one of the principal sources of Ossianic poetry, is the Colloquy of the Ancients. Connected with this cycle are a large number of romantic tales which are even now alive in Gaelic Ireland and Scotland. To the comparatively smaller saga-groups belong the *Iomhramha* or "Sea-voyages," a literary genre as well as a conception peculiar to the Celts. These voyages were undertaken by pious pilgrims who, in search of the Land of Promise or of nothing more than a place of retirement and prayer, trusted themselves in a frail bark on the ocean to the will of God. They seem to have taken place in the 6th and 7th centuries when the Irish missionary spirit was most fervent. The most famous examples are the Voyage of Saint Brendan and the Voyage of Mael Duin. There are many other interesting tales of adventure in early Irish literature. Most of them are of native origin; for others the Irish story tellers got their characters and scenes from Greece, Norway and the Orient. Classical and mediæval literatures also had their influence, and the imitations which the Irish made of them, such as the versions of the Odyssey, the taking of Troy, Theseus and the Minotaur, Philip and Alexander, the loves of Dido and Aeneas, show what foreign books were most in vogue in Ireland. On the other hand, from the débris of the literatures of the Celts have come the influences which have revolutionized European art. For the Arthurian romances, the Tristan and Grail sagas and the germ of the Divina Commedia, the world is indebted in the last analysis to Irish imagination. In Ireland, as in all Celtic countries, is to be found the oldest vernacular prose and poetry and the most developed folklore in western Europe. Much of this has been published but it represents only a small part of the great body of tradition. The earliest annals of Ireland have not been preserved. That they existed is proved by later citations. The oldest extant are the Annals of Tigernach (died 1088), of Innisfallen, of Leinster, of Boyle, of Ulster, of Connaught, of Loch Cē, the 'Chronicon Scotorum,' and those of the Four Masters; in all, they range from the 11th to the 17th century. There are many smaller annals and works on genealogy, geography, topography, and, in modern times, the learned compilations of Geoffrey Keating in his 'History of Ireland' (1629). The in-

terpretation of Irish law was originally in the hands of the *filid,* later on of the brehons or "judges." This law is strictly native and extremely interesting. The principal treatises are made up chiefly of texts read and decisions rendered in the Irish law schools. Most of the manuscripts on the subject date from the 16th century, but according to tradition the texts go back to the 4th and 5th centuries. The largest and most important collection is known as the 'Senchus Mōr,' which deals with all possible personal relations. There are also treatises and compilations of all kinds, on medicine, pharmacy and astronomy, but especially on Latin and Irish grammar and Irish metrics, both of which were favorite studies with the ancient Irish. Valuable native glossaries, such as Cormac's of the 9th century, O'Mulconry's and O'Davoren's, have been preserved; they consist of words which had become archaic in the time of the compiler and which he explains in more modern Irish.

Early Gaelic poetry is very largely on topographical, geographical, historical and chronological subjects and of little poetic value. It is the production of the learned court poets in their official capacity as historiographers, whose business it was to praise a king or family or chronicle the death of a warrior, and it is of interest only for history proper and for the history of the Irish language. Of late years only has attention been directed to the genuine old Irish lyric poetry. This is of very high quality and shows, among other things, that in the literature of the Irish, much earlier than in the literature of any other people, the love of nature found expression. From the 17th and 18th centuries, the flourishing period of Munster poetry, to the present day, though hundreds of poems are irretrievably lost, the production has been so great that out of those poems alone could be written a history of modern Ireland.

II. Scottish Gaelic Literature.— The attention of the world was first called to the literature of the Celts by the publication, in 1760, of some fragments of Gaelic poems, purporting to be genuine Gaelic ballads, by the ingenious Scottish Highlander, James Macpherson. His 'Fingal,' which appeared in 1762, had an extraordinary success with the great writers of France and Germany. Manuscripts containing Scottish literature are neither so old nor so numerous as the Irish and are generally posterior to the 16th century. The oldest is the Book of Deer, a gospel-book of the 9th century in Latin but containing half a dozen words in Scottish Gaelic of the 11th or 12th century. The Gaelic literature of Scotland is almost exclusively in verse. The prose, of which much less is known, belongs chiefly to religious literature, which has been extensively cultivated since the Reformation. The first printed Gaelic book was the translation, in 1567, by Bishop Carswell of John Knox's 'Prayer Book.' There are many fine collections of hymns from modern times; the most celebrated of the religious poets was Dugald Buchanan, who was born in 1710. The oldest and most precious collection of poems is known as the Book of the Dean of Lismore (James Macgregor) and is now kept in the Advocates' Library, Edinburgh. It was compiled in the first half of the 16th century, at the time of the transition from Irish to Scotch Gaelic, and contains some 30 Ossianic poems. The subjects treated are about the same as are found in Ireland, which is to be expected, since the literature of Scotland, in its earlier stages, drew its inspiration and themes from the motherland. In fact, the early poetry of the two countries is so closely intertwined that distinction is scarcely possible. Comparatively few of the Scottish tales deal with the older, or Ulster, cycle. Most of them tell of the deeds of Finn and his companions, and it is this so-called Ossianic saga cycle that has taken on a new life in the Highlands. Much of this ballad material, though appearing only in later texts, can be traced back to the 12th century or earlier. But it is not so much in compositions whose subjects were derived from the epic legends common to Ireland and Scotland that the great richness of Scottish Gaelic literature consists, as in ballads which sing of events in the history of the country or were inspired by the observation of nature. Only the most eminent of the surprisingly great number of poets and poetesses who flourished from the time of Mary Macleod (1650–1720) to that of our contemporary, Mary Macpherson, poets of whom any country might well be proud, can be mentioned here. Alexander Macdonald and Duncan Bān Macintyre, both of the 18th century, are the most pleasing and may be called the real national poets of Scotland. To the same century belong Robert Mackay (Rob Donn), distinguished as a satirist, and William Ross, at his best as a poet of nature, James MacGregor and Ewan Mac Lachlan. In addition to the work of the known poets, there are great collections, such as the 'Leabhar na Feinne' and the 'Leabhar na Gleann,' and anthologies and periodicals containing an immense quantity of anonymous verse and one of the richest literatures of folklore, popular sayings and proverbs in Europe.

III. Manx Literature.— Almost all the Manx texts which have been printed are of a religious character, namely, the Bible, finished in 1775, the Book of Common Prayer, with the Psalms (1610), and Bishop Wilson's sermons (1783). But the Isle of Man had a share in the earliest legends which take the place of history in Ireland. Some of the figures of the Ulster saga are found in Manx tales, and it is likely that the Manxmen had Ossianic ballads of their own. The most original feature of their literature, however, is the carols or carvels which are still sung on Christmas eve in the churches at the service called in Manx *Oiel Vorry,* "Mary's Eve." Only a small part of these have been published. There is, besides, a fair amount of folklore, some of which consists of tales belonging to the Gaelic stem and, in 1796, Th. Christian translated into Manx a part of Milton's 'Paradise Lost.'

IV. Welsh Literature.— Welsh literature is neither so old, so original, nor so varied as Irish. It has nothing to compare with the Irish epic tales, and the oldest form of Cymric speech consists only of glosses to Latin works in the 9th and 10th centuries. Nor has it any such vellum codices as those mentioned under Irish literature. The oldest and most important manuscripts are the Black Book of Carmarthen, a collection of poetry belonging to the end of the 12th century; the Book of Aneirin, of the middle of the 13th century; the Book of Taliesin, of the end of the same century; the White Book of Rhydderch, and the Red Book

of Hergest, both of the 14th century. The Myfyrian Archaiology of Wales, published in 1801, is an enormous, though uncritically edited, collection of old poetry, and other anthologies have appeared since and down to the beginning of the 18th century. The oldest literary pieces are poems ascribed to Aneirin, the author of the heroic poem, the 'Goddodin,' to Taliesin, called "the Head of the Bards," and to Llywarch Hĕn, "the aged," author of elegies, all of them bards who, according to tradition, lived in the 6th century. Some poems are even ascribed to Myrrdhin (the celebrated enchanter Merlin), but, even though the language of these poets is dark and obscure, it cannot belong to that period. The oldest literary prose texts were not composed before the 12th century. The ancient laws of Wales, codified by King Hwel Dda, "Howel the Good," who lived in the first half of the 10th century, are unaffected by foreign influences and are of importance both for the science of law and because they show the life, manners and social conditions of the insular Britons in the early Middle Ages. The original draft of the laws is lost, but there are at hand law books from the 11th to the 14th centuries, containing the laws arranged according to three divisions of the country. All the Welsh epic romances are in prose, as in Irish, but without the interpolation of verse passages. The oldest and most famous are known as the 'Mabinogion,' by which is meant a collection of tales, marvelous or romantic and of divers nature and origin. The redaction, as we have it, cannot be earlier than the end of the 12th century, and the Red Book and the White Book, in which the tales are preserved, date from the 14th, but the legends which compose them certainly record traditions that were in circulation ages before. The word "Mabinogion" is the plural both of *mabinog,* a disciple or aspirant bard, and of *mabinogi,* meaning the state, condition or training of a *mabinog* or his literary stock-in-trade. The 'Mabinogion' differ greatly in character and in age. Of the 12 tales which are comprised in the collection, only four, 'The Four Branches,' are rightly called 'Mabinogion.' Some of them deal with persons and events of a very remote antiquity; others belong to the age of chivalry. However Welsh literature may be related to Irish, it shows a common origin with it, but the relations between these two bodies of romantic fiction have not yet been satisfactorily determined. The oldest historical writings in Wales are in Latin, but there are chronicles in Welsh, called 'Bruts,' after Brutus, the eponymous hero of the Britons, and genealogies. Medicine was a favorite study in old Wales, and some fragments of recipes for curing ailments and precepts of hygiene as well as some tracts on physics and natural history have been preserved.

The early Welsh bards were greatly given to abstractions and fine-spun distinctions, and their thoughts were further hampered by the complicated verse of the professional schools. The theme of their poetry was mostly heroic and elegiac. As evidence of their artificiality we have the Triads, in which personages and deeds of the past are forced into groups of three. They cover a wide range of subjects — history, bardism, theology, ethics and jurisprudence — and the majority are 15th century productions, though some go back to the 12th. Although of doubtful historical value, they are none the less precious as showing the manner in which the scholars of the time codified and handed down their learning.

As in Ireland, the Welsh bards were attached to the houses of the chiefs and formed a guild apart from the rest of the community. Some of them in later days were forced to become wandering minstrels, and the troupes of poets became so numerous and so importunate that complaints are found against them in royal decrees from the 13th to the 16th century. Their flourishing period was in the 14th century and their most distinguished representative was Dafydd ab Gwilym, a contemporary of Chaucer and in some respects the greatest poet of the entire Middle Ages. Dafydd died in 1368. He sang of many subjects but as a poet of love and of nature he is unsurpassed by any Provençal troubadour or German minnesinger. Early in the 15th century the deeds of the celebrated Owen Glendower became the subject of patriotic songs, and Iolo Gŏch, who ranks next to Dafydd ab Gwilym as a poet, in the early part of the 15th century urged on his countrymen in their wars with the English. Among the hundreds of poets of modern times who have made notable the Welsh renaissance which has lasted to our own times, the most eminent was Goronwy Owen, who, born on the island of Anglesey in 1723, found a grave in America. The religious literature in Welsh is enormous and constantly growing. It began with lives, genealogies and legends of saints and was continued with the translation of the Bible by Bishop William Morgan, in 1588, and by the modern religious movement. There are Welsh versions of 'Paradise Lost' and of 'The Divine Comedy.' The masterpiece of modern Welsh prose is undoubtedly Ellis Wynne's satire on the follies of the world, namely 'Gweledigaetheu y Bardd Cwsc,' i.e., 'Visions of the Bard Sleep.' The Welsh are celebrated for their songs and no occasion is without them. The most curious are the *pennillion,* short, epigrammatic poems on every conceivable subject. They have been collected by hundreds. More is printed in Welsh, in books, papers and magazines, than in all the other Celtic languages together.

V. Cornish Literature.— Though there are reasons to believe that Cornwall was influenced to some extent by the Welsh literary movement in the early Middle Ages, the earliest extant literary fragments, dating from the 14–16th centuries and almost exclusively of religious contents, show a closer relationship to the literature of Brittany than to that of the Welsh. Apart from some old forms of the language which have a linguistic value, Cornwall's contribution to the literature of the Celts is of the slightest and consists chiefly of mystery plays. One of these is a trilogy on the Creation of the World, the Passion and the Resurrection. These Mysteries show little originality and are clearly modelled closely on Latin sources. The 'Life and Death of Saint Meriadek,' which was first performed in 1504, is more interesting but not of much higher literary value. The Lord's Prayer, the Creed, the Ten Commandments, some chapters of the Bible and a few proverbs and maxims is all else that survives of Cornish.

VI. Breton Literature.— Nor have the earliest literary monuments, such as they were,

of the Armorican Bretons been preserved. There is an abundance of gloss material, which is our best source of information on the earliest form of Brythonic speech, but for literary remains, for a connected Breton text, we have to wait until the beginning of the Middle Breton period at the end of the 15th century. This early literature, too, is almost exclusively religious and consists of such works as a translation of the 'Hours,' the 'Death of Our Lady,' and the 'Life of Man,' all of them belonging to the 16th century. In Brittany, more than in other Celtic lands, the theatre has met with popular favor and the Bretons still have a peculiar fondness for dramatic composition and performances. Upwards of 150 Breton mystery plays are known to exist, of which about 25 have been published. The oldest is the Life of Saint Nonn, mother of Saint David. The Great Mystery of Jesus, of the Passion and Resurrection was published in 1530. The authors of these pieces were, for the most part, priests or former ecclesiastical students, though in some cases even uneducated artisans and small farmers were the playwrights. The Mysteries were mostly adaptations from the French and betray their foreign source also by the large amount of French words with which they are larded and by the versification. Most of the subjects are taken from the Bible, lives of saints and pious legends, though a few belong to the romantic cycle and to such beliefs, for example, as the Purgatory of Saint Patrick. Though they show little art and little originality, they are interesting and valuable under several aspects, as for their local color and their picture of the life of the period and as one of the last manifestations of the mediæval Mystery. In the course of the preceding and present centuries, efforts have been made, and with considerable success, to revive and modernize the Breton theatre, and to provide it with subjects of a moral, historical and humorous character. In this field, the Vannetais poet, J. Le Bayon, is *facile princeps*. Of much more interest are the ballads, songs and folklore. We owe the beginning of attention to these subjects to the Vicomte Th. H. de la Villemarqué (1815–95), who, in 1839, published his famous collection 'Barzaz Breiz' which, as in the case of Macpherson's 'Ossian,' enjoyed great success in Europe and gave rise to a protracted and heated discussion. The searching criticism to which the 'Barzaz' were subjected has proved that they were largely due, both as to matter and to form, to the author himself. Nevertheless, just as in Scotland in the similar case, these poems gave the start for a serious study of the popular Breton ballads. The most fruitful endeavors in that direction were made by F. M. Luzel (1821–95) who, in 1868, published the 'Gwerziou,' short ballads or complaints or village tales in verse, of a very dramatic quality and usually of tragic interest, and, in 1890 and following, with the aid of Anatole Le Braz, the 'Soniou,' sailors', soldiers', scholars' and workmen's songs of love, marriage and satire. The popular literature in Brittany is of extraordinary wealth and every effort has been made to preserve it, with the result that a great deal has been published, partly as taken down in Breton from the lips of the speakers or, to a larger extent, retold in French. It consists mostly of legends of saints, of death, of the sea and of *pardons*, and is all of the greatest interest to folklorists. The contemporary poets, from Brizeux, who died in 1858, to Jaffrenou, still living, to mention only the best known names, form a brilliant galaxy whose poems are to be found in separate editions, collections and reviews.

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JOSEPH DUNN,
Professor of Celtic Languages and Literatures, Catholic University of America.

CELTIC PEOPLES. Hecatæus of Miletus and Herodotus (5th century B.C.) are the earliest authors to mention the Celts, and they speak of them in connection with the Danube. The Greek geographers got their information at second or third hand from merchants and sailors and their notions on the subject were very hazy. According to Ephorus (4th century B.C.), of the four peoples who inhabited the extremities of the world, the Celts lived in the west. There are many moot points in the earliest history of this great race, which may be accounted for partly by the vague and indiscriminate use of the names by which the Celts and the peoples identified or assimilated with them in western and northern Europe were known to the ancients; e.g., Hyperboreans, Κελτοί, Celtae, Celtici, Cimbri, Κελται, Γαλάται, Galatae, Galli, Γάλλοι, Celto-Ligyes, Celtiberians, Celtillyrians, Celto-Thracians and Celto-Scythians, the exact determination of which it may never be possible to decide. It is probable that the name Celt (the meaning of which is unknown; the one most often given is "high, noble") was originally only that of a tribe or fraction — and that not the largest — of the Celtic branch of the Aryan family. The name was never used by the Celts at any time when speaking of themselves. By some authors the Celts were identified with the Germans. There is anthropological reason for believing that, even at the time when they first appear in history, the Celts were a mixed race and included not only other branches of the Aryan family but even non-Aryans as well, the autochthonous inhabitants, Ligurians and Iberians, of the countries to which the Celts came as a superior people, imposing their language and customs upon them. More than 150 Celtic tribes are known to us by name, due, in part, to numerous migrations. The question: Were the Celts and Gauls ethnically one people?, is now definitely answered in the affirmative; but other questions in Celtic ethnology are still debated, though archæology, linguistics and craniometry have been brought to bear upon them. The view that there was on the Continent an older group of Celts who preserved the Indo-European sound *qu* (the so-called *qu* group) and were followed by a conquering group, who changed that sound to *p* (the so-called *p* group) is now almost generally discarded. Though we know but little of the language of the ancient Belgae, it is sufficient to class it with that of the Celts and perhaps to identify the Galates and the Belgæ. Anyhow it is clear that Γαλάται and Κελτοί are two distinct words and that neither of them has anything to do with the modern names Goidelic and Gael. Though antiquity seems to be almost, if not entirely, unanimous in representing the Celts as tall and blond, there is reason to believe that there were two so-called Celtic races, clearly distinct, in ancient Gaul. There, as elsewhere in what is or was Celtic speaking territory, we find short and dark, and tall and fair, longheads and broadheads among them. Hence "Celtic" as an ethnic term is a vague appellation and, as is well known, all those who speak or spoke Celtic do not or did not necessarily belong to the same race. It must have taken many hundreds of years for the Celts to spread all over Europe and their language with them, and they must have mingled with many races. Yet, while we cannot speak strictly of a Celtic race ethnologically, we can speak of a Celtic race philologically and culturally, a race which has preserved and transmitted, as a bond of union, a common speech, mentality, institutions, religion and lore from the days of their origin to the present day. For practical purposes it is well to keep to the traditional division of the Celts, and to speak of the "Celts" as a generic term for all the branches of this once powerful and widespread race; to call "Gauls" those who occupied Cisalpine and Transalpine Gaul, and "Galates" those who established a small state in Asia Minor. Some would place the ancestral home of the Celts, about 1,000 years before Christ, in northern Gaul and central Europe; others, in northwest Germany, the Danish islands and the Netherlands, near the Elbe and the German Ocean; others, near the Caspian Sea and in southern Russia. The best received opinion, however, is that their home was in southern Germany, between the upper courses of the Rhine, the Main and the Danube. From this comparatively restricted focus they spread out like a fan in all directions but chiefly toward the fertile fields of the peoples more favorably situated to the south and west of them. As early as the 9th century B.C., some of them crossed the Channel and settled in what is now Great Britain, and others, in Ireland, perhaps in the 6th century. Probably in the 7th century B.C. or earlier they crossed the Rhine and firmly established themselves in Gaul. A century later they crossed the western Pyrenees, reached Spain and occupied most of the Iberian Peninsula. Their domination there lasted until the end of the 3d century with the conquest by the Carthaginians. About 300 years B.C. they entered southeastern Gaul. At the end of the 5th or beginning of the 4th century B.C. other detachments invaded northern Italy and Bohemia, the latter probably through the valley of the Danube. They had previously invaded northern Italy in the 6th century and

later they founded a settlement on a large scale north and south of the Po as far as the Alps and broke up the power of the Etruscans. This region afterward became the home of an important literary culture, where Virgil, Catullus, the two Plinys and Livy were born. This exploit of the Celts is the best known to history and archæology. In 390 B.C. they sacked Rome except the Capitol. Their fame spread rapidly and made a great impression on the imagination of the Greeks and Romans and for a long time the Celtic peril kept Europe in terror. At the other extremity of Europe they are found as mercenaries in the service of foreign princes, fighting in Greece, Africa and Egypt. Alexander the Great had dealings and made alliance with them. Celtic bands from Thrace and Macedonia in 279 B.C. pillaged Delphi, crossed the Euxine Sea and founded an independent state in Phrygia and Cappadocia, the kingdom of Galatia. To the descendants of these Asiatic Celts it was that Saint Paul addressed his Epistle to the Galatians.

The Celtic empire, called *Celtia* by the Romans, was at its greatest extent for some centuries before 300 B.C., and stretched from Ireland to Asia Minor. With their warlike colonies the Celts had ploughed a deep furrow over the ancient world in every direction, in the valleys of the Danube, Rhine, Po, Seine, Rhone, Loire, Thames and Douro; the Danube continued to remain a Celtic river until its basin was absorbed in the Roman empire. They have left imperishable traces of their wanderings on the topography of Europe. Wherever there is a place the second term of whose name is derived from *dunum* (a fortified place), e.g., Carrodunum (Krappitz on the Oder) and Noviodunum (Isaktcha in Rumania), *ritum* (a ford), *magus* (a field), *briga* (a hill), for example, it marks a Celtic settlement and such places are found over a wide belt as far north as Westphalia and as far east as the Dobrudja and southern Russia. The Celts were known to the Germans as Volcae, the name of a Celtic tribe on the upper Danube, and it is by this name, Germanized to Walah, that the Germans afterward knew the successors of the Celts, viz., the Romans and the Romance speaking peoples of the Empire; whence, Wallachia, Walloons, Welsh, Wales, etc. The Celts succumbed to the Carthaginians, the Roman legions and Teutonic tribes. For 250 years, but especially during the 1st century B.C., the Romans fought them in northern Italy and it took 350 years to Romanize them. But, as a result of Roman conquest and Germanic invasion, the continental Celts were absorbed and lost to history. In modern times they have almost succumbed to the inroads of the Danes, the Normans and the Saxons. They had never formed a political unity under one supreme authority. The nearest they approached to it was under King Ambicatus and their nearest approach to a confederation was during the heroic defense, in the year 50 B.C., under Vercingetorix, before the fortress of Alesia. But if they had no strongly centralized power, they possessed a linguistic unity over against Greek, Latin and German speech and to a certain extent a moral, cultural and religious unity which was probably greater than the scattered documents would lead us to believe. It is a misfortune that their civilization was cut off before it had time to mature. Archæology and Celtic literature have shown that the Celts possessed a civilization, intellectually, industrially and socially considerably higher than that of their German neighbors across the Rhine, and that their influence spread even over regions into which the arms of the Celts never penetrated. What archæologists call the La Tène period, or Late Celtic, a comparatively high stage of civilization which extended from about 400 B.C. to 1 A.D., arose in southern Germany along the Rhine in the centre of what was specifically Celtic territory. In certain respects the insular Celts (in Britain and Ireland), even at the time when Christianity was introduced among them, were at a more primitive stage of civilization than their kinsmen in Gaul in the time of Julius Cæsar. As for the character of the ancient Celts, we must remember that almost all our information on the subject comes from the writings of their enemies. These all agree, however, in emphasizing their love of fighting, daring and adventure; their contempt of death; their honor, devotion, and fickleness, withal; their vanity, self-consciousness, imagination, loquacity and religiosity; and in this characterization they are corroborated by what we know from the ancient literature of the Celts and from the lives of the Celtic peoples of our own times.

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JOSEPH DUNN,
Professor of Celtic Languages and Literatures, Catholic University of America.

CELTIC RENAISSANCE is the name given to that comprehensive intellectual awakening, which manifested itself in a remarkable revival of interest, displayed during the latter part of the 19th and the beginning of the 20th century and continued up to the present, in the languages, the literatures, the earlier history, the ethnological groupings, and the ancient religions, laws, customs, modes of life, ways of thought, and amusements of the native inhabitants of Ireland, the Highlands of Scotland, Wales, Brittany, Cornwall, and the Isle of Man. Included under the general heading is that splendid outburst of literature, written in English, during practically the same period, by Irishmen and Irishwomen and deal-

ing with essentially Irish themes, on which, as a distinguishing designation, the specific title Irish Literary Revival has been conferred. This part of the general movement is so important and so well and widely known that to it, exclusively, the title of Celtic Renaissance is sometimes given in error. To assign a precise cause or an exact date as the beginning of the Celtic Renaissance is difficult, if not impossible, for many causes and many dates, each inherently probable, might be named; but perhaps it may be here tentatively suggested that the publication, in 1853, of J. C. Zeuss's 'Grammatica Celtica,' based on the Old Irish glosses which he rediscovered on the Continent, is an all-important philological fact. It is true that at no time, for several hundred years, were the cultivation and the study of some at least of the Celtic languages and literatures entirely neglected, and many Irish, Welsh, Scottish and European scholars consecrated themselves to such pursuits. The mention, in this connection, of Francis O'Molloy, Edward Lhuyd, Legonidec, H. B. MacCurtin, Vallancey, Bopp, Pritchard, Pott, Pictet, John O'Donovan, Eugene O'Curry and Whitley Stokes — to name no others — will be sufficient indication of what is meant. But Zeuss's epoch-making work which established definitively, for the first time, that the Celtic group of languages belongs to the great Indo-European family, and was fortunate enough to have its conclusions accepted, gave an unprecedented stimulus to the examination of those languages in both their earlier and their later developments. On the literary side, Ernest Renan, in 1856, interpreted the Celtic spirit in his 'La Poésie des races celtiques,' and Matthew Arnold's Oxford lectures, published as 'The Study of Celtic Literature' in the *Cornhill Magazine* in 1867, insisted on the benefit to be derived from knowing the Celt and things Celtic more thoroughly. Thenceforward French, German and Italian savants, as well as enthusiastic scholars in Ireland, England, Wales, Scotland and America, gave increasing attention to the linguistic peculiarities of the various Celtic languages and dialects, and, almost as a necessary consequence, busied themselves in deciphering, editing and translating the many manuscripts in which the literature had lain enshrined but to a large extent buried away. Now, some of that literature was so wealthy, so noble, and so diversified, that soon its influence began to filter down from the desk of the scholar to the easy chair of the ordinary reader, and the movement, while remaining scientific in the hands of the trained linguist, took on, from another point of view, a decidedly popular tone. While old-established societies continued their work along traditional lines, but with increased vigor, new ones were formed, and periodical publications were issued, for the purpose of disseminating a wider knowledge of the subject, and of still further developing its popular scope. In Ireland, the Society for the Preservation of the Irish Language, established in 1877, was followed, in 1880, by the Gaelic Union, and this in turn, in 1893, by the Gaelic League. An organ for the necessary propaganda, namely, *Irisleabhar na Gaedhilge* (*The Gaelic Journal*), was started in 1882, and this was in due course supplemented by the official publications of the Gaelic League. Other Dublin publications, printed mostly in English but also partly in Irish, like *The United Irishman, Sinn Fein* and *The Leader,* gave hearty support, and even political daily papers found it to their advantage to print a column or two in Irish. The *Feis,* or festival of Irish story-telling, poetry, song and recitation, as well as of Irish music, dances and games, was employed throughout the country as a further instrument for the revival of the old Gaelic spirit. Since 1898, the *Oireachtas* (assembly), held every year in Dublin, has been the culmination of those festivals. See GAELIC LEAGUE.

In Scotland, the movement also took its rise with the scholars and men of letters, and gradually percolated downward. The Gaelic Society of Inverness, founded in 1871, whose valuable *Transactions* have now reached over 30 volumes, offered, in 1875, bonuses to teachers who would agree to teach Gaelic in the Highland schools, and more recently it succeeded in having instruction in that language officially recognized and sanctioned by the Scottish Education Department. Another Highland society for the preservation and cultivation of the native speech is *An Comunn Gàidhealach* (The Gaelic Society), founded in 1891, which holds a yearly assembly, called the *Mòd,* somewhat along the lines of the Welsh Eisteddfod or the Irish Oireachtas.

There is also a vigorous press propaganda in Scotland. The *Celtic Review,* dealing more particularly with Irish and Scottish Gaelic, made its appearance in 1903. Two periodicals, *Guth na Bliadna* (The Voice of the Year), a quarterly started in 1904, and *An Deo-Greine* (The Sunbeam), first published in 1905, devote a considerable portion of their space to Gaelic. In 1908, a weekly newspaper, *Alba,* printed entirely in Gaelic, was founded. A fortnightly paper, also wholly in Gaelic, *An Mac-talla* (The Echo), was published in Prince Edward Island up to 1905. Side by side with this scholastic and popular activity in Gaelic, a Scottish Celtic revival was conducted in English in the quarterly magazine, the *Evergreen,* published in 1895 and 1896 at Edinburgh. Among its contributors were Patrick Geddes, S. R. Crockett, Sir George Douglas, Gabriel Setoun, Sir Noel Patton, Riccardo Stephens, William Sharp and "Fionna Macleod." The various books written by "Fionna Macleod," who has long since been identified with the poet William Sharp, are among the most distinctive literary products of the Renaissance in Scotland, for they show in a pronounced degree many of the traits of Celtic art.

With some 250,000 speakers of Gaelic, the teaching of the subject in the schools, the fostering care of the various societies, and an enthusiastic campaign in the press, the preservation of the native speech of the Highlands seems assured. The Isle of Man did not escape the general movement. This little island, traditionally regarded as the former kingdom of the Gaelic god Manannan, has about 4,500 speakers of Manx out of its total population of about 55,000. It is a dominion of the Crown of England, but enjoys self-government to a very large extent. It has its own Parliament, known as the Tynwald Court, consisting of the Council, or upper branch, and the House of Keys, or lower branch. The decrees of this

Parliament, when approved by the representative of the Crown, are supreme. They are promulgated in old Manx, as well as in English, before the people on the sacred Tynwald Hill. Not only do representatives of the island attend the various Celtic gatherings of other countries, but there is also a society for the preservation of the Manx language, services in Manx are held in some of the churches, columns in Manx appear in the papers, classes in Manx are conducted at Douglas and there is a Manx section at the annual Guild Festival. The one formerly Celtic section in which the Celtic Renaissance might be expected to find no responsive echo was the English county of Cornwall. Its native language was supposed to have finally died out so far back as the last quarter of the 18th century, and its inhabitants seemed completely absorbed in the English nationality. It had, however, Celtic traditions and even some remains of a Celtic literature, and one or two actual speakers of Cornish successfully established their right to represent Cornwall at the Cardiff Eisteddfod in 1899 and at the Pan-Celtic Congress held in Dublin in 1901. In 1902 there was established the *Cowethas Kelto-Kernuak* (Society of Cornish Celts), whose object, in addition to saving from destruction the megalithic monuments of the country, the feudal ruins, the old crosses, the ancient chapels and the legendary wells, was to restore the Cornish language and to revive the popular Cornish open-air dramas and bardic solemnities. It seems a gigantic, almost impossible, undertaking; but, as Charles Le Goffic says, in this connection: "There is such a power of recovery in the Celtic races that, among them, the wildest dream of to-day often becomes the established fact of to-morrow."

In Wales, there was far less need for a linguistic or literary revival than elsewhere, for Welsh nationality remained of a pronounced type, and from early in the 18th century the Welsh language, owing to its constant use by the Methodist preachers, had had a wide vogue both as a spoken and a written medium. The society known as the *Cymdeithas y Cymmrodorion* had been established as far back as 1751, and two periodicals entirely in Welsh, namely, *Trysorfa y Gwybodaeth* (Treasure of Cymric Knowledge) and *Cylchgrawn Cymraeg* (Cymric Review), date, respectively, from 1770 and 1793. In 1792 there was established in London an important society, the *Cymdeithas y Cymreigddion,* which engaged in a search for Welsh manuscripts, and published, in 1801–07, the result of its labors under the title of 'Myvyrian Archaiology.' Through the exertions of the prime movers in this Society, the *Eisteddfod,* or National Assembly, whose origin is lost in the mists of antiquity, but which can with some certainty be traced back to 1135, was revived in 1819, under the direction of the *Gorsedd,* and has been held every year since without intermission. In Wales, therefore, the seed of the Celtic Renaissance fell on fertile soil and grew apace. Willing workers were not wanting, and, by 1895, no fewer than 57 periodicals in the Welsh language were making a regular appearance. In addition, many newspapers published in the principality and in the near-by large English cities print several columns in Welsh. Nearly a million persons, out of an approximate population of 2,000,000 (2,030,271, according to the census of 1911), are speakers of Welsh. Welsh is used in the pulpit and taught in the schools, and chairs of Welsh have been founded at the colleges of Aberystwyth, Cardiff and Bangor and in the University of Wales.

In Brittany, at the beginning of the 19th century, the native language had sunk almost to the level of a patois. It was restored to some literary dignity primarily by Legonidec, who had fled to Great Britain as a political refugee and, seeing there what was then being done for Wales, determined to try to do as much for his own country. His *Grammaire celto-bretonne* appeared at Paris in 1807, and his *Dictionnaire breton-français* in 1821. People of standing and position became interested, and the teaching of Breton was introduced into a number of schools. The native language, however, fell under the ban of the Second Empire, and the *Association bretonne,* which was founded in 1844, was dissolved in 1859, and was not re-established until 1873. In 1870, the *Revue Celtique* was started by Gaidoz, and in a few years chairs of Celtic were endowed in various French centres, and were given to scholars like Gaidoz himself, D'Arbois de Jubainville, Loth and Ernault. However, the ukase against the teaching or the use of Breton in the state schools of Brittany remained, as it still remains, in force. To combat the danger that, while higher Celtic studies flourished, the Breton language might perish in its native home, the *Association bretonne* appointed, in 1895, a permanent committee for its preservation. The efforts of this committee were seconded by the *Union régionaliste bretonne,* founded at Morlaix in 1898, whose object is not only to preserve the Breton speech but also to reconstitute the Breton life in all its forms. In pursuance of its policy, the *Union régionaliste* held, in 1899, a meeting similar to the Welsh Eisteddfod, the Irish Oireachtas, and the Scottish Mòd, and these festivals took place annually thereafter. The result of all these endeavors is that Breton is now taught in the schools not controlled by the state; that several periodicals, some partly, some wholly, in Breton, are published; and that there are still some million and a quarter of people who use Breton as their native tongue.

The Celtic Renaissance was not confined to Europe. It spread wherever the ubiquitous Celt had made for himself a home: to Canada, to the United States of America, to Australasia, to far away India and Ceylon, to Argentina, even to Patagonia. Not to speak of the departments of Celtic which have been established at Harvard, Yale, Columbia, Johns Hopkins and Chicago, nor of the chair of Celtic founded at the Catholic University of America in Washington, sermons, etc., in Welsh and in Gaelic are preached in different parts of the United States and Australia and journals published in these languages in those and other countries, while encouraging their readers to loyalty to the land in which they live, serve also to recall to their minds the homes which they or their forefathers left, and to put before them, as a stimulus, the varied achievements of the great race from which they are sprung.

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PATRICK J. LENNOX,
Professor of English Language and Literature, Catholic University of America.

CELTIS, a genus of trees of the natural order *Urticaceæ*, closely related to the elm. *C. australis* is the nettle-tree. See NETTLE-TREE.

CEMBRA PINE. See PINE.

CEMENT. A cement is any compound which, under certain conditions, is plastic and under others develops tenacity and can be used for holding together various materials; hence glue, lime, asphaltum, mucilage and solder are cements. By far the most important class of cements structurally and commercially are the hydraulic cements, compounds of lime, silica and alumina that have the property when mixed with water to a paste of cohering or setting and finally becoming stone hard, even under water. The hydraulic cements may be divided into four classes based on differences in the materials used. The setting is probably due to the same general chemical reactions in all hydraulic cements; the silicates and aluminates formed in burning take up water and are converted into hydrated calcium silicate and aluminate and crystalline calcium hydrate. The quickness with which these reactions take place vary, the composition of the original materials and the differences in the methods of manufacture being the controlling factors. Quick-setting cements may become hard in a few hours, while some slow-setting cements require many months to reach their maximum tenacity.

The four classes of hydraulic building material above mentioned are: (1) *Hydraulic lime* made from a limestone containing a small proportion of clay (8 to 10 per cent) by burning at a low temperature and slaking the burned rock with water. (2) *Hydraulic* or *natural-rock cement* made from a limestone containing a relatively high proportion of clay, by burning at a low heat and grinding the product to powder. (3) *Portland cement* made from an artificial mixture of carbonate of lime (either chalk, limestone or marl), with a certain proportion of clay, burning at a white heat and grinding the clinker to powder. (4) *Pozzuolana* or *slag cement* made by mixing some kinds of finely-ground scoria (volcanic ash) or blast-furnace slag with a small proportion of slaked lime. Of these the second and particularly the third are of chief importance in this country, though the manufacture of slag cement is a promising industry.

The manufacture of hydraulic lime, though carried on to a considerable extent in France, has never been established in this country, probably owing to the abundance of excellent cement-rock in New York, Pennsylvania and other States. Hydraulic lime is light and bulky compared with the other cements. It requires from one to several days to set and hardens slowly, but some grades resist the continued action of sea water even better than Portland cement.

Natural-rock Cement.— This material, also known as common cement, hydraulic cement, Rosendale cement and quick-setting cement, is manufactured in considerable quantities in some parts of the United States. It is made also in France, but the German and English output has been insignificant for some years. In the United States the material used is limestone, often containing over 23 per cent of clay, and the limestone is generally dolomitic, that is, contains carbonate of magnesium. In Europe magnesian limestones are seldom used. The cement rock is quarried, broken and burnt in continuous kilns, much as limestone in the manufacture of ordinary lime. The burnt rock is a mass of partly vitrified clinker not affected by water. It is ground in mills of several types. Formerly all plants used millstones, and the light yellowish or brownish powder, fine enough to pass a 50-mesh screen, is sent to market in barrels containing about 300 pounds, or in sacks. When mixed with water this cement sets in a few minutes and hardens gradually. It is cheap and when mixed with one part of sand by weight is used for mortar or concrete and for cistern and reservoir linings. It has not the great tensile strength of Portland cement, hardens slower and more imperfectly.

The composition of Rosendale cement rock and natural hydraulic cement is as follows:

Carbonate of lime	45.91
Carbonate of magnesia	26.14
Silica and insoluble	15.37
Sesquioxide of iron, Alumina	11.38
Water and undetermined	1.20
	100.00

Silica	22.75
Alumina and iron sesquioxide	16.70
Lime	37.60
Magnesia	16.65
Alkalis	.....
Carbonic acid	5.00
Sulphate of lime, Water	1.30
Total	100.00

The chief centre of the industry in this country is the Rosendale district of Ulster County, N. Y., where the rock quarried is a limestone of the lower Helderberg series. It is also made in Pennsylvania, the Louisville region of Kentucky and Indiana, at several points in Illinois and around Milwaukee, Wis. The natural or Rosendale cement industry has weakened since 1903, and the production is now comparatively small.

Production.— The total production of Portland cement in the United States in the year 1916 was 91,521,198 barrels, valued at $100,947,881, an increase over the 1915 figures by 6.5 per cent in amount, and 36.6 per cent in

value. The shipments from the mills for the year, however, were 3,031,098 barrels more than the production — from the reserve stock left over from the previous year. The price obtained by the mills varied from 94 cents per barrel in eastern Pennsylvania to $1.64 per barrel in Utah. (These figures do not include the barrel or bag in which the cement is marketed). The production was pretty well distributed over the entire country, but the output in the so-called Lehigh district, comprising eastern Pennsylvania and western New Jersey, was notably larger in proportion, amounting to nearly 30 per cent of the whole. The reserve for another year's supply left at the mills at the close of 1916 amounted to 8,360,478 barrels.

Of natural cement and puzzolan cement the production in the United States in 1916 amounted to 842,137 barrels, valued at $430,874 — an average of 51.2 cents per barrel. Only one puzzolan plant (at Birmingham, Ala.) was active during the year.

Consumption.— The total consumption of cement in the United States is arrived at by adding the shipments from the mills to the imports for the year, and subtracting the exports. On this basis the 1916 consumption appears to be 91,990,156 barrels — 7,621,288 barrels (about 9 per cent) more than in 1915. The highest per capita consumption for the year was that of Iowa, 1.77 barrels. Following this were Michigan with an average of 1.58 barrels and California with 1.51 barrels. In 17 of the States the consumption exceeded one barrel per capita, due in large part to extensive construction of public works in those States. See CONCRETE; LIMESTONE; MINERAL PRODUCTION OF THE UNITED STATES; PORTLAND CEMENT.

CEMENTATION PROCESS. See ARMOR PLATE; IRON AND STEEL; STEEL MANUFACTURE.

CEMETERY, a place of sepulture. See BURYING PLACES.

CEMETERY LAWS, official regulations governing graveyards where the dead bodies of human beings are buried; their management and the care of the avenues, walks, grounds, tombstones and sculptures, used for general or ornamental purposes. Two classes of cemeteries are recognized in law: the public cemetery, used by a community, neighborhood or church, and as much a public place as a courthouse or a market; and the private cemetery, used only by a family, or a small portion of a community. Statutes in California and Montana define that where six or more human bodies are buried at one place, such place is a cemetery. Cemeteries are controlled by police authority in so far as the private interests in rights of burial relate to public welfare. The establishment or suspension of cemeteries, the regulations for their use, are provided for by legislation. Ordinarily, cemetery corporations are not supposed to be organized for pecuniary profit, but rather for public than for private purposes; jurisdictions, however, differ on these points; ethical custom inclines to the latter view. Provisions in corporate charters do not prevent the exercise of police power in the public interest; conversely, a corporation cannot be deprived of its charter rights by arbitrary interference of police power. Further burials in a cemetery as dangerous to public health may be prohibited; to prohibit burials as detrimental to neighboring real estate values is considered an unreasonable and oppressive exercise of police power. Cemetery lots are subject to the rules of sale and purchase made by the corporation or municipality owning them. Municipalities and corporations usually formulate reasonable rules for the care, adornment and management of lots and cemetery grounds, and heavy penalties are incurred by wilful desecration or unlawful interference with the vested rights of owners. To avoid the possiblity of the sale of cemeteries for non-payment of taxes, State legislatures usually exempt them from taxation. Similarly, a grave, vault or burial lot, in which bodies are interred cannot be seized for debt, nor can an owner raise a mortgage or loan on it, this being contrary to public policy. See also BURIAL; BURYING PLACES; CREMATION; DEAD, DISPOSAL OF THE; FUNERAL RITES. Consult Mack, W., and Hale, W. B., eds., 'Corpus Juris' (Vol. XI, pp. 49–69, New York 1917).

CENCI, chĕn'chē, **Beatrice,** Italian lady, the cause of the extermination of the noble family of Cenci. Muratori, in his 'Annals' (Vol. X, part 1, 136), relates the story as follows: Francesco Cenci, a noble and wealthy Roman, after his second marriage behaved toward the children of his first marriage in the most shocking manner, procured the assassination of two of his sons, on their return from Spain, by banditti, seduced and debauched his youngest daughter Beatrice, a maiden of singular beauty. She discovered this shocking crime to her relatives, and even sought to obtain protection from Pope Clement VIII. It appears, however, that this was not granted; for, when the guilty father continued his former treatment with aggravated wickedness, she joined with her brother Giacomo, and hired two assassins, who put the monster to death as he slept. The guilty parties were discovered, confessed the murder on the rack and were condemned by the Pope to be torn to pieces by horses. In vain did the learned Farinaceus exert himself to obtain a mitigation of their punishment by a lively representation of the depravity of the deceased, 9 Sept. 1598. According to other accounts, Beatrice and her relatives appear to have had little or no share in the murder of the old Cenci; but a tissue of villainy and baseness gained belief in the false testimony of two banditti against the Cenci family. So much is certain, that, 11 Sept. 1599, Beatrice Cenci and her stepmother were executed with a sort of guillotine called mannaia. Giacomo was killed with a club; the younger brother was pardoned on account of his youth; but the estates of the family, to which belonged the Villa Borghese, were confiscated, and in 1605 presented by the reigning Pope, Paul V, of the house of Borghese, to his family. In the Barberini Palace at Rome, travelers are shown an excellent painting, said to be by Guido Reni, as the portrait of the unfortunate parricide; but this is now controverted, and recent investigations tend to show that the popular version of the whole story is far from the true one. Shelley has made the Cenci the subject of a drama. Consult Bertolotti, 'Fran-

cesco Cenci e la sua famiglia' (1877); Muratori, 'Annali d'Italia' (Milan 1744–49).

CENCI, The. Shelley's poetic tragedy 'The Cenci' was his one attempt to write "for the multitude" and for the stage. Though following the model of Elizabethan tragedy, and containing echoes from Shakespeare, mainly from 'Lear,' 'Macbeth' and 'Othello,' it is yet a work of individual genius. While it may be uncritical to assert that 'The Cenci' is "the greatest English tragedy since Shakespeare," it is safe to say that no tragic poet since Webster has equalled this play in sombre power. The plot is founded on an old manuscript account of the crime, trial and execution of Beatrice, a daughter of the great Roman family of the Cenci, at the close of the 16th century. This particular account, one of many such that appeared within the century following the event, is utterly misleading in its picture of Cenci as an unnatural monster and of his daughter as an angel of light; but Shelley accepted it as authentic, and followed it closely, except that he adds the banquet scene in the first act. His interest was increased by the supposed portrait of Beatrice, once attributed to Guido, then in the Colonna, now in the Barberini, Palace. The play was published in London in 1821, with a second edition in 1822. Though received with comparative favor by the public, it was rejected by the London theatre manager on account of the nature of its subject, and was unsuccessful when acted for the first and only time under the auspices of the Shelley Society in 1886. Shelley, who was an almost infallible critic of his own poetry, said, "It is a work of art; not colored by my feelings nor obscured by my metaphysics." And, indeed, 'The Cenci,' intrinsically great, is no less than astonishing as the production of the poet of 'Prometheus Unbound.' Except for this evidence, no one could have credited Shelley with such knowledge of human character and such power to represent it.

Owing to the difficulty of presenting the incidents of the story on the stage, the action of 'The Cenci' is weak. The fifth act, however, is not only perhaps the finest thing that Shelley ever wrote, but certainly compares favorably in all essentials of tragedy with anything outside of Shakespeare. The characterization is on the whole firm and convincing; though Orsino, whose crafty wickedness is contrasted with the utter insolence of Cenci, seems hardly consistent. The vacillating Giacomo and the irresolute Lucrezia throw into high relief the unwavering will of Beatrice, who grows in nobility until at the close she fills the action with the splendor of her purity and strength, a tragic heroine claiming kinship with the greatest of her kind — with Antigone, Electra, Juliet, Constance, and Webster's Duchess. The diction is simple and concrete; the style, highly dramatic and appropriate. Except the description of the chasm in the third act, not a passage, scarcely even a line, but contributes directly to the action or characterization. The effect of the play is that of unrelieved gloom. "In it culminates that fascination of horror in Shelley which was as characteristic as his worship of beauty and love, though it is less omnipresent in his poetry" (Woodberry). The 'Cenci' has been edited for the 'Belles Lettres Series' by Professor Woodberry. Mrs. Shelley's notes and Shelley's preface to the play are given in the Centenary edition also. Consult pages 126–29 of Symonds' 'Shelley' ('English Men of Letters'); Crawford, F. Marion, 'The True Story of a Misunderstood Tragedy: with New Documents' (*Century Magazine*, Vol. LXXV, No. 3, pp. 449–66).

MARION TUCKER.

CENEDA, chā-nā'dä. See VITTORIO.

CENIS, sĕ-nē', **Mont,** a mountain belonging to the Graian Alps, between Savoy and Piedmont, 11,755 feet high. It is famous for the winding road nearly 40 miles in length constructed in 1803–10 by Napoleon I, which leads over it from France to Italy, and for an immense railway tunnel, which required nearly 14 years' labor. It superseded a grip railway which was constructed over the mountain by Mr. Fell, an English engineer, in 1864–68. The tunnel does not actually pass through the mountain, but through the Col de Fréjus, about 15 miles to the southwest. The Mont Cenis Pass is 6,765 feet above the level of the sea, whereas the elevation of the entrance to the tunnel on the side of Savoy is only 3,801 feet, and that on the side of Piedmont 4,246 feet. The total length of the tunnel is 42,145 feet, or nearly eight miles. For the sake of the drainage the bottom of the tunnel has a culminating point about the middle, and falls southward 128 feet, and northward 473 feet. The breadth of the tunnel at the base is about 25 feet, at the widest part about 26 feet; its height at the Modane end is 24 feet 7 inches; at the other end about a foot higher. The determination of the exact direction and height of the tunnel occupied a full year, and the work of piercing the tunnel was carried out with so much precision that the borers who had begun simultaneously from both ends met exactly. The tunnel is laid out for two lines of railway. The roof and walls are lined with masonry to the thickness of two feet seven inches, and where the ground is not very firm it is underarched. The boring was at first carried on by hand labor, and one-eighth of the total length of the tunnel was finished in this way, but the rest was constructed by machines specially devised for the purpose. Each boring machine had 18 borers, by which holes about three feet in depth were wrought in the rock. For the blasting of every yard of the tunnel 97 borings on an average had to be made, and above 100 pounds of gunpowder were employed. The total cost of the tunnel amounted to $14,475,000, which was borne partly by the French and Italian governments and partly by the Northern Railway Company of Italy. The first mine of the tunnel on the Italian side was exploded by Victor Emmanuel at the end of August 1857; on Christmas Day, 1870, the workmen met in the middle of the tunnel; and on 17 Sept. 1871, the tunnel was officially opened. See TUNNELS.

CENOBITES (Gr. Κοινος, common, βιος life), monks living in community with others, under a common rule instead of seeking the strict solitude of anchorites. The ascetics of the first ages, who dwelt in the deserts together, were usually called by this name, the place in which they lived being called a *cœnobium.*

Some writers refer the institution of these communities to the times of the apostles, others to Saint Anthony (q.v.).

CENOGENESIS. While many animals during post-embryonic growth pass through a series of stages which are similar to the ancestral forms of such types (palingenesis), in certain species development is direct. The different stages of growth or metamorphosis are crowded back to the embryo stage, or abbreviated, and the animals hatch or are born in the shape of their parents. This is called cenogenesis. Thus certain frogs, as a tree-toad of Guadeloupe, W. I., where there are no marshes, do not pass through a tadpole stage, but hatch without tails, and with legs, and otherwise resemble their parents. The same is the case with certain shrimps and crabs, and is partly the case with the lobster. In all such instances the direct development is apparently due to a difference in the environment, or other conditions of life, especially in certain crustacea, to a change from salt to fresh water.

CENOTAPH, sĕn'ō-tăf, a monument erected in honor of a deceased person, but not containing his body, as is implied from the derivation (Gr. *κενός* empty, and *τάφος* a tomb). They were often erected by the ancients, who believed that when the body was not buried the soul could not be admitted into the abodes of the blessed. Consult Virgil, 'Æneid' (3, 304); Xenophon, 'Anabasis' (6, 4, 9). In Suetonius, 'Claudius' (Bk. 1), such a tomb is called "tumulus honorarius".

CENOZOIC, sē-nō-zō'ik, **ERA,** the last of the great divisions commonly used in classifying geological time, and therefore including the present. As it is the last, its records are much more complete than those of the Mesozoic, but while more complete they are, perhaps, more perplexing. Of the older eras — as, for instance, the Palæozoic — much of the record left in the rocks has been obliterated, and thus only the traces of the greater changes in the distribution of land or water and of variations of climate have come down to us. Thus, while much is lost, the broader grouping of facts is easier. In the Cenozoic we have such a wealth of detail, such a great mass of evidence to sift and correlate, that geologists differ greatly as to how the record of the rocks shall be translated.

Generally speaking, the rocks of the Cenozoic Era are less compacted than those of the Mesozoic, being very often beds of loose sand or clay. They usually lie horizontal, though sometimes upturned in a great mountain range. Any particular series is seldom of wide extent, and different series tell widely different stories of climatic conditions. Thus, probably no series in the Cenozoic in North America is comparable with the coal-bearing formations of the Cretaceous.

As to the climate of the Cenozoic, it was at first remarkably mild and even, Spitzbergen and Greenland having as mild a climate as that of Ohio to-day. Gradually the climate became colder, resulting in the great continental glacier of the Ice Age. At a comparatively very recent date these glaciers receded, and the climate of the earth became substantially what it is to-day.

Cenozoic life is, on the whole, well differentiated from Mesozoic, particularly by the great development of mammals and, probably well along in its last half (reckoning by actual time), by the advent of man. As mammals have developed, so reptiles have declined, and to-day only snakes, crocodiles, lizards and turtles represent the class; the great ichthyosaurs, pleisosaurs, dinosaurs and pterosaurs were passing away by the end of the Cretaceous. In fact, as the Mesozoic was the era of reptiles, so is the Cenozoic the era of mammals. Among invertebrates many curious Mesozoic types have disappeared, but of the genera in existence early in the Cenozoic most still exist. This also is true of Cenozoic plant life.

As has been noted, geologists differ in their divisions and subdivisions of Cenozoic time. American geologists generally make two great divisions, Tertiary and Quaternary.

The era is marked off from the Mesozoic, which precedes it, by the great disturbance which formed the Rocky Mountains. Throughout, the continent of North America was largely out of water, with a few minor exceptions. The Atlantic and Gulf Coastal Plain underwent several successive submergences and emergences. The present site of the Coast Range was largely submerged till mid-Tertiary time, when a pronounced period of folding formed the Coast Ranges. The Alps and Himalayas were probably also elevated at the same time. A period of submergence occurred in the northeast, at the close of the Glacial Period, in late Quaternary, which drowned Lake Ontario and Lake Champlain, separating New England as an island. (See also GEOLOGY; GLACIAL PERIOD; TERTIARY). Consult Dana, 'Manual of Geology'; Geikie, 'Text-book of Geology'; Le Conte, 'Elements of Geology.'

CENSER, a vessel in which incense is burned. Censers were employed by the Jewish priests for presenting incense to the Lord in the sanctuary. Josephus tells us that King Solomon made 20,000 gold censers for the temple of Jerusalem to offer perfumes in, and 50,000 others to carry fire in. Censers or thuribles are used in some modern churches, especially in the Roman Catholic Church at mass, vespers and on other occasions. They are suspended by chains, by which they are swung about in the hand to spread the incense in all directions. They are usually made of brass or copper, sometimes of silver or gold. Of their precise shape before the 12th century there is little record. The earliest ones are richly decorated, set with jewels and sometimes made in the form of small churches. They were also often made in two hollow halves shaped like a ball. The upper half varies very much in form. The lower half holds the charcoal and the incense, while the upper half is perforated with holes to allow the smoke to escape.

CENSORS, sen'sorz. In ancient Rome, originally two magistrates whose chief duty it was to keep the register of property, on which all political rights were based; the community being graded by amount of income from estates. Being thus arbiters of the political and social position of every freeman, they speedily became the most important officials in the state except the occasional dictators. The supreme judicial functions, and the control of morals (*regimen morum*), fashion and speech, which

we associate with "censorship," flowed naturally from this. The essence of their duty being to fix the status of each citizen, they took cognizance of everything which bore upon it; and became arbiters of the sumptuary laws and customary observances which are the cement of early communities. Not only could they expel a senator from the Senate and take his horse from a knight or even reduce him to the ranks for lack of property qualification, or notorious evil living, but they could punish for slack tillage, celibacy, demeaning occupations, extravagance or any other conduct thought prejudicial to the common weal. There was an appeal to the popular assembly, however, and they had to state their charges publicly. The censors also filled vacancies in the Senate and appointed its chief, originally at will, later according to a prescribed list. They also administered the state finances, which included the regulation of the *tributum* or property tax; of the *vectigalia,* such as the tithes paid for public lands, salt works, mines, customs, etc., which were usually leased out to speculators for five years. Consult Leuze, 'Zur Geschichte der römischen Censur' (Halle 1912), and the article "Censor" in Smith, 'A Dictionary of Greek and Roman Antiquities' (3d ed., London 1890). The term, legendarily five years at the outset, was a year and a half in historical times, and re-election was forbidden; originally patricians alone were eligible, but by fully historical times the plebeians had gained one censorship and occasionally secured both. The Emperors assumed censorial power under the title "prefects of morals." The last who bore it was the brother of Constantine the Great.

In American history, the title was given to two sets of State officers in imitation of the Roman office. The 1776 constitution of Pennsylvania provided that the people should elect a council of censors once in seven years, two for each city and county, to investigate the acts of the governmental departments, inquire whether or not the constitution had been violated, etc. This curious article was dropped in the revised constitution of 1790. But in Vermont a similar article had a far longer life, surviving until a comparatively recent time. That State in 1777 proclaimed its independence and drew up a constitution. One article, following the example of Pennsylvania, provided that on the last Wednesday of March in 1785, and the same day every seventh year thereafter, the people should choose a council of 13 censors, who should examine whether the constitution had been preserved inviolate; whether the legislature had performed its duty as a guardian of the people, or had exceeded its powers; whether the taxes had been justly laid and collected, and how the public moneys had been expended; and whether the laws had been duly executed. They were also empowered, if they thought a change in the constitution was needed, to call a convention to meet within two years thereafter, giving notice of the proposed change at least six months before the meeting. The last one so called, in 1870, abolished its creator; but the censorship seems to have worked fairly well for nearly a century.

CENSORSHIP OF THE PRESS, a regulation subjecting books, pamphlets and newspapers to the examination of certain civil, military or ecclesiastical officers, who are empowered to authorize or forbid their publication. Such a regulation was suggested by Plato, and an informal censorship existed in the times of Greece and Rome. After the Roman Catholic Church acquired a share in the civil power it induced the state to condemn heretical books. Throughout the Middle Ages it sanctioned the principle that books objected to by its authorities should be suppressed. The invention of printing and the increasing number of books called forth new and stricter prescriptions of censorship, and copies of books printed in 1479 and 1480 are accompanied with solemn approbations and attestations in their favor. Finally, in 1515, the Council of the Lateran, assembled at Rome, decreed that in future no books should be printed in any town or diocese unless they were previously inspected and carefully examined by the bishop of the diocese or his deputy, or by the inquisitor of the diocese or his deputy, or if at Rome, by the Pope's vicar and the master of the sacred palace. Every work which was approved was to be countersigned by the hand of the censor, and any publication not thus countersigned was to be burned and its author or editor excommunicated. See INDEX LIBRORUM PROHIBITORUM.

In countries where the Reformation prevailed, the censorship was not abolished. Licensers of books were appointed in England, who were for the most part bishops. A general system of censorship was established by a decree of the Star Chamber, dated 11 July 1637, which was later confirmed by an act of Parliament. It was against this act that Milton wrote his great plea for freedom of the press, the 'Areopagitica,' but the censorship was not abolished until 1693.

Censorship of the press existed under the old French monarchy. It was abolished at the Revolution, but revived under Napoleon I and again under Napoleon III. Except in Russia and Germany, where it is still in force, systematic censorship of the press may be said scarcely longer to be maintained in European Christian countries. In the United States there has never been such a censorship, although there are laws against publications of a scandalous character; there are various State laws against libel and a government censorship in the Philippines.

In times of war strict censorship of the press is exercised to prevent the publication of information that might be useful to the enemy. The operations of the British Press Bureau during the great European War were the subject of much bitter criticism and frequent debate. It was stated that Sir Edward Cook and Sir Frank Swettenham were joint directors of the Press Bureau for which, however, the Home Secretary was responsible. It was further explained that the actual censorship was supervised by the military and naval authorities and that the Press Bureau was only responsible for permitting publication. The most spectacular act of censorship undertaken by the military authorities and confirmed by the Home authorities was the suspension of the London *Globe* from 6 Nov. to 22 Nov. 1914.

CENSURE, in canon law, a spiritual penalty whereby a contumacious offender is denied the use of certain spiritual goods. It has three degrees, excommunication, suspension and in-

terdict. By excommunication the offender is cut off from association with the faithful whether in spiritual things or in secular; by suspension a minister of the Church, a cleric, is deprived of the right to exercise the functions of his station; by interdict the services and ministrations of the Church are denied to an offender — the sacraments and the right to Christian burial. An interdict may affect places as well as persons; it may be laid on a church edifice or a burial place. Censures are the penalties prescribed in the Church's law for definite offenses, and some censures fall upon the offender, ipso-facto or ex ipso-jure, without need of a judgment being pronounced by Church authorities. Such a censure is said to be *latæ sententiæ*, that is, providing for its own carrying out; but most censures are *ferendæ sententiæ*, requiring that the sentence be pronounced by some proper authority, as the bishop of a diocese or his deputy. And absolution from some censures *latæ sententiæ* is reserved to the Supreme Pontiff, while absolution of other censures can be given by bishops, or other pastors, either in the ordinary course of their jurisdiction or in virtue of special faculties accorded to them to that end. An example of a censure, release from which is reserved strictly to the Supreme Pontiff himself, is the censure of excommunication incurred by whoever violently assaults a cleric or a member of a religious order (*clericus vel monachus*); but an exception is made of the case where the offender is in danger of death.

CENSUS. The utility to a government of knowing the extent of its resources in men and property is so obvious that some means of ascertaining it were probably employed early in history; but there is no record of it on the Egyptian or Assyrian inscriptions, and the Chinese accounts are dubious. The first we have reliable mention of is that of the Jews by David, including the males of 20 and over and the cattle; and the hatred and suspicion aroused by it are witnessed by the belief that God punished the whole people for the impiety. This apparently irrational feeling was universal in early times, has always been so in the East and is by no means unknown elsewhere and later; its prevalence in 18th century America, and even later in England, however, is probably due to misunderstood Bible teaching. The real reason was, that the early census had for an object not statistics, but taxation and conscription; and it was not to the advantage either of officials or people that the government should have too minute a knowledge of what could be extorted from them. Poverty and sparseness of population were too convenient excuses for not paying taxes or not remitting them to the capital. In the West, however, when constitutional government replaced autocracy, the census became a necessity for apportioning political rights and contributions; as in the Solonian constitution of Attica, where society was divided into four classes, with privileges graded according to income from landed estates. In Rome, whence the name "census" ("assessment") comes, it was much the same; and as the enumerations were valued merely for the ratings deduced from them, not from any idea that statistics by themselves were of any value, they were discarded as soon as their use had passed, to the irremediable impoverishment of history. These censuses were taken at long and irregular periods, sometimes nearly half a century elapsing. But as the empire grew and the provinces were farmed by proconsuls, these found the same need of a thorough detail of their temporary estates, to know whether their sub-farmers were cheating them, that a capitalist does of his business; and each took a census (*professio*) of his own province on his own account, whose inquiries were sometimes almost as minute and exhaustive as those of the latest United States special census report on agriculture.

The mediæval censuses were of the roughest and far apart, and made only by a few enlightened rulers. Charlemagne attempted one for his dominion; and the Domesday Book of William the Conqueror in 1181 is familiar. This was a register of estates, with the heads responsible for feudal duties, their slaves and cattle — a census of the primitive type for the primitive objects.

The modern census, as a statistical review for its own sake, has a treble origin, in Sweden, England and the United States. In 1686 the Swedish parish clergy were required to keep a record of births, marriages and deaths, accessions and removals of inhabitants, unusual happenings, etc. Of course registration, which is a record of changes, is not a census, which is a statement of condition at a certain time; but with a given basis it can be turned into one. By request of the Swedish Academy of Sciences, in 1746, the clergy were directed to compile statistics of population, etc., for a quarter-century past; but these were kept rigidly confidential till 1762. At their publication Dr. Richard Price, the founder of scientific life-insurance calculation, based his first insurance tables on them. At first annual, then triennial, since 1775 they have been published once in five years. Meantime, in England, the London bills of mortality, first begun after the plague of 1592, had been recorded weekly since 1603, the year of James I's accession; and in the last half of the 17th century Sir William Petty, the noted political economist, used them as a basis for very valuable and stimulating works on the extent and growth of population, human fecundity, effects of social and political causes, etc. Others took up the subject and made computations. In 1791 Sir John Sinclair undertook the most herculean statistical task ever attempted, perhaps, by a single man — to compile a census of the population, agriculture, trade and industries of the entire kingdom, by inquiries sent to the clergy of the Established Church. He sent out schedules of 160 interrogatories, received over 900 replies, and in 1798 published 21 volumes of results. His work, and his exhortations made weighty by his work, induced Parliament in 1800 to establish a census office; the first census was taken the next spring, and decennial censuses have been maintained ever since. That of 1851, like the American of 1850, was a long step in advance. The Russian census had begun earlier, but on the most ancient model, purely for military purposes, and therefore with no count of females. There were a few partial censuses from 1700 on. In 1718 Peter the Great ordered all landed proprietors to give in an account of their slaves; and the same year organized a body of

canvassers to visit all the provinces and make returns to him of peasants, mechanics, domestics and people without occupation. In 1722 a ukase ordered a census taken every 20 years thereafter, and it was observed till 1782, another taking place in 1796. In 1802 a central bureau was organized and a census taken; and they have been taken in 1812, 1815 and 1834, decennially 1850–80, then in 1886 and 1897. France began taking them after the Revolution, Prussia in 1805; Austria, which had made rough counts for military conscription, organized a bureau in 1828; Belgium established one immediately after winning her independence in 1833, and it has been perfected by the genius of Quetelet and other eminent statisticians and furnished most valuable contributions to science. Our own census was entirely independent of all these in origin.

The United States Census.—For the various guesses at colonial population and the methods of arriving at them, see UNITED STATES (*Population*). It may be mentioned here as germane to this subject that when Governor Hunter of New York in 1712 attempted to take a census, the biblical prejudice before mentioned compelled him to leave it unfinished; and that when the New Jersey government a few years later wished to do so, it did not dare begin. An accurate determination, however, became vital early in the independent life of the country. To apportion equally the burdens of the Revolutionary War, the Congress of the Confederation agreed to defray the charges out of a common treasury, to be supplied by the States in proportion to the value of all the land in each; and to requisition the quotas of land forces according to the quotas of white inhabitants. Under the constitution of 1787 the question of number became exigent, as direct taxes and representatives in Congress were apportioned according to the number of free inhabitants in each State (including bound servants and excluding Indians not taxed) and three-fifths of all others. Censuses, therefore, became part of the ordinary running machinery of the government; and the first one was taken in 1790. Nine months were allowed for the work, but the time was extended the next year, as regularly for many a decade thereafter. The scope of inquiries simply included families: the name of the head alone being set down, with the number of others included, and slaves as a property item, the sex and color of free persons, the number of free white males of 16 and upward, number of free white females, and of all other free persons. The enumeration was committed to the marshals of the judicial districts of the United States (16 in all), who were to employ assistants as needed. No form of schedule was provided, each enumerator using any sheets or blank book he chose. This continued till 1830. There was no central bureau to receive or supervise returns, which were put together by the marshals and transmitted to the President. A penalty of $200 was imposed for false returns or delay beyond a certain time; and the same on individuals for giving false information or refusing any. The returns in the North were given by counties, cities and towns; in the South by counties only. Two copies of the enumeration of each district were to be posted in some public place therein. The cost of this census was $44,377.28. The result, as usual, pricked many local bubbles; and as the country was not used to this, there was not only general disappointment but distrust of the census, and the United States officials carefully explained to foreigners that the returns were very defective. This is not now believed.

The second census, that of 1800, was specifically entrusted to the Department of State. There was no change in methods, except that the Secretary was to instruct the marshals as to schedules and interrogatories. The only changes in scope were to classify the ages of free white males rather more minutely, extend the classification to females and insert the name of county, city or town where the family resided. Memorials by Thomas Jefferson and Timothy Dwight, under the names of learned societies, wisely suggesting that Congress utilize the occasion by having the census include statistics of mortality, nativity and industries, were ignored; but took root in later censuses. There were 19 districts and the cost was $66,109.04.

The third census, that of 1810, improved somewhat on the loose methods of the two former. The enumerators now had to be residents of their districts, which could not be more than one county or city, but might be several contiguous towns, and must be plainly marked off by natural or political boundaries; and they must make personal inquiries at each dwelling-house or of the head of each family in their district. In Territories the secretary, or if there was none, the governor, replaced the marshal. Attested copies of the returns must be filed with the Secretary of State. An attempt at a manufacturing census was made, and the Secretary of the Treasury was empowered to give instructions for it. But the time was too short; the inquiries were too many and injudiciously framed; the manufactories in a district were generally so few that the returns would disclose their private business, and there was no penalty for refusal to answer; and the returns were scattering and valueless for volume, though they had some value as indicating variety and distribution of industries. There were 26 districts and Territories, and the cost was $178,444.

The fourth census, that of 1820, for the first time introduced the valuable feature (suggested by Jefferson and Dwight) of distinguishing between natives and foreigners, naturalized or otherwise. It also discriminated the free colored and the slaves by sex and age, and the free whites between 16 and 18. It reduced the manufacturing interrogatories to 14, of much the same scope as now, and a digest was ordered made and printed. This department was a failure as before, however. There were 31 districts and the total cost was $208,525.99.

The time of taking the fifth census, that of 1830, was changed on John Quincy Adams' suggestion to 1 June, as it has ever since remained. A very significant provision in the act was to prevent the marshals from blackmailing their subordinates, by exacting either bribes in advance or part of their pay later. Printed schedules were sent out, of uniform size, 18x15. The industrial statistics were dropped altogether. But inclusion was made of the deaf and dumb — white, free colored and slave — classified by age but not by sex, and of the blind, not classified at all. Ages were also very minutely classified. There were 36 districts and Territories, and the cost was $378,545.13.

The sixth census, that of 1840, was in one respect the beginning of a new era; in most others, the close of an old one. It first attempted health statistics — those of the insane and idiotic, at public and private charge; educational — scholars in colleges, academies and public schools, illiterates over 20, etc.; besides Revolutionary pensioners, an item wholly aside. Industrial statistics were also restored, and much matter collected. In a word, it was the first systematic and connected attempt to make the census a general body of usable statistics in the larger sense, a comparative survey of the life and changes of the country. But the effort is all that can be praised; its execution was a national scandal. The errors were so teeming and so monstrous that various bodies sent protests to Congress against its publication, and urged that it be either corrected, or if that were not possible, entirely disowned. This result was due partly to inadequate pay and ignorant enumerators, but partly also to the dislike in many sections to the new questions as "inquisitorial" and offensive. The old dislike to governmental "prying" was strong enough to warrant a prominent paper in becoming its spokesman, insinuating that the census was a "precursor to direct taxes," and that it was unworthy of "the dignity and the high functions of the Federal government to pursue such petty investigations." There were 39 districts, and the cost of the census was $833,370.95. It was published in three volumes.

All these six censuses had a common defect which robbed them of ultimate statistical value: They lacked uniformity in method, and to a large extent could not furnish comparisons or accurate deductions. The enumeration extended over long periods, many months at a time; the results were not summarized by counties, nor uniformly by cities or towns; the classification of ages of colored people was on a different basis from that of whites, etc.

The seventh census, that of 1850, begins a new era. The blunders of the last one, and the public disgust and indignation, had aroused great discussion as to proper methods; and on 3 March 1849, the same act which created the Department of the Interior also created a census board, consisting of the Secretary of State, the Attorney-General and the Postmaster-General, to prepare a census schedule including not above 100 inquiries. They framed plans which were adopted by Congress 23 May 1850. These schedules comprised: (1) Free inhabitants; (2) Slaves; (3) Mortality; (4) Products of agriculture; (5) Manufactures; (6) Social statistics. But the great advance which it made was in scheduling individuals instead of families, thereby making full statistical comparison for the first time possible. The name, age, sex, color and place of birth of each person, free or slave, were now set down. Improvements in method were also made. The enumerators' districts were to be not exceeding 20,000, if feasible, on the basis of the last census; the returns were not to be compiled by the marshals, but at a central office in Washington created within the Department of the Interior. Its head or "supervising clerk," commonly called "superintendent of the census," was Joseph C. G. Kennedy of Pennsylvania; the latter part of the compilation was done under the charge of James D. B. De Bow of Louisiana. There were 45 districts, and the work cost $1,423,350.75.

The eighth census, that of 1860, was on much the same lines as the previous one. Mr. Kennedy was superintendent. Fortunately, the enumeration was finished before the war broke out. The principal change in schedules was to classify females as well as males by occupation. In the compilation, slaveholders and slaves were classified by States and Territories for 1850 and 1860. There were 64 marshals and secretaries. Cost, $1,969,376.99.

The ninth census, that of 1870, was taken under changed conditions, some of which interfered with its completeness and accuracy. The mass of enfranchised negroes in the South could no longer be counted on plantations by one authority, and were too ignorant to answer questions for themselves; and the Reconstruction conditions greatly impeded work. A new system had been carefully drawn up by Garfield, after consultation with Francis A. Walker, Edward Jarvis and other eminent statisticians, which would have made partial amends; but it was killed in the Senate. It formed, however, the basis of the next census. General Walker, then chief of the bureau of statistics in the Treasury Department, was made superintendent, and his ability did much to redeem the defective system. The heading "slaves" had of course to be dropped and the number of male citizens of the United States to be substituted. To satisfy the 15th Amendment, a schedule was introduced of the number of such citizens whose right to vote was denied or abridged except for crime, etc.; but it was valueless. The month of births and marriages within the year was added. In "colored," Chinese and Indians were discriminated from negroes. In "illiterates," those unable to read were distinguished from those unable to write. In nativities, the place of parents' birth was added for the first time giving the number of native citizens of foreign parentage. A statement of public debts, State, municipal, etc., was included. Many changes were also made for clearness, or to remove objectionable inquiries. The enumerators were put under civil-service reform rules.

A strong effort was made to have an intercennial census taken in 1875, but it was not successful, though Grant recommended it in two annual messages. But for that of 1880, the system desired for 1870 was passed, under Garfield's presidency, completely revolutionizing the census methods. The changes may be summarized as follows: (1) The superintendent of the census and his chief enumerators, instead of being mere clerks of the Secretary of the Interior, became officials directly appointed by the President and confirmed by the Senate. (2) The marshals — court officers appointed for duties unconnected with census work and often conflicting with it — were replaced by supervisors of the census, not to exceed 150 in all, and each State or Territory to have at least one. The entire number were appointed and New York State had 11. Their assistant enumerators were subject to veto by the census office. (3) The enumerators' districts were reduced to an estimated maximum of 4,000 instead of 20,000, these subdivisions being also subject to the disallowance of the census office. This increased the number of enumerators from

about 6,400 in 1870 to 31,265 in 1880; and enabled not only a swifter completion of work, but much closer local and personal knowledge on the part of enumerators, as each must be a resident of his district. (4) The time of enumeration was reduced to one month, or two weeks in cities of over 10,000 inhabitants by the previous census; making results more nearly simultaneous. (5) Compensation was more closely adjusted to work. (6) Industrial statistics for 279 cities and large towns, and for the country at large in certain selected industries, were withdrawn from the regular enumerators and given to certain special agents, who need not be residents. The enormous advantage of this scarcely needs exposition. Not only did it allow the employment of abler experts, but manufacturers will often give information to distant strangers, to be filed far off, which they would not put in the hands of local residents. In this census also a large use was made of "prior schedules," left with parties before the enumerator called; they had been introduced in 1870 but little employed. This census was by far the best, speediest and most helpful of all to that date and marked another era. The scope was also extended. For the first time the statistics of defectives, crime and pauperism were thoroughly and properly classified; those of the factory system, of churches, museums, taxation, insurance, etc., entirely new, with better ones of schools and colleges, collected independently, were of great utility; and many improvements were made in other schedules. General Walker was the head of this census also and the author of most of its advances. Its cost was $5,790,678.40.

The 11th census, that of 1890, was in general taken by the same methods as the 10th. Ten chiefs of division were appointed, 175 supervisors and 47,975 enumerators. The superintendent was Robert P. Porter. The most important additions were: (1) All surviving soldiers, sailors and marines of the Civil War, and their widows. (2) Classification of colored persons according to amount of white blood, from full-blooded negroes up to octoroons. (3) Indebtedness of private corporations and individuals. (4) All Indians in tribes, with Indian and English names of each, age, occupation, and whether paying taxes or not. (5) Census of Alaska. (6) Unincorporated express companies. An attempt was made to collect statistics of chronic disease; but the inquiries were too delicate to entrust to local residents to expect people to communicate to such, and the statistics gathered were of no value, besides exciting much public ill-will. Special agents were employed for 1,042 manufacturing centres, in place of 279 in 1880. Special attention was paid to nativity, to fecundity of native and foreign-born mothers, the expectation of life of children of native and foreign-born parents, naturalization and ability to read and speak English. Prior schedules were extensively used. Electric tabulation was employed, not alone greatly increasing both speed and accuracy, but enabling various statistical compilations to be made which were otherwise impracticable. It filled 25 volumes, and cost $11,547,127.13.

For the 12th census, that of 1900, preparations had been mooted before the 10th was well under way; and the question of a permanent census bureau, strongly urged over half a century since by the able statistician De Bow, was brought up, and its merits set forth in a valuable and exhaustive report by Superintendent Porter. On 1 July 1902 the Bureau of Census became a permanent office in the Department of the Interior. A year later it was transferred to the newly-created Department of Commerce and Labor, and since 4 March 1913 it has been under the Department of Commerce. The superintendent of the census is entitled the director of the census. The President, who appoints him, must also appoint an assistant director, who must be an expert statistician; and the director is to appoint five known and tried statisticians as chiefs of divisions, a geographer, a chief clerk and a disbursing clerk. The first director under this bill was William R. Merriam; assistant director, Frederick H. Wines; chiefs of divisions, William C. Hunt, population; William A. King, vital statistics; S. N. D. North, manufactures; Le Grand Powers, agriculture; Walter F. Wilcox, methods and results; geographer, Henry Gannett. The law creating this bureau, however, greatly limited its scope. The inquiries were restricted to the four heads of population, mortality, agriculture and manufactures. For the 13th census, E. Dana Durand, of California, was appointed director 26 May 1909, to succeed S. N. D. North, resigned. Work began 15 April 1910, with a staff of 70,000 enumerators and 330 supervisors. More than 200,000 persons took the examinations for the position of enumerators. These examinations were local and those recommended were again examined in Washington. Great improvements had been made in tabulating machinery, 300 of which turned out work faster and cheaper than in 1900. An elaborate card system was employed. A card was prepared for each person enumerated. These were run through the machines and the facts readily compiled in various combinations. Congress appropriated $12,000,000 for expenses of the census, to which an additional appropriation of $2,500,000 had to be added.

The methods of presenting the results of the 13th census were a new and, in some respects, a radical departure from former practice. The most important change was in the Abstract. Formerly the Abstract had been included in a small octavo volume, issued after the publication of the complete reports, and contained no text discussions and very few percentages, averages or comparative statistics. The Abstract for the 13th census is a quarto volume of 569 pages, presenting the résumé of the principal statistics, extensive text discussions in terms familiar to all, analysis of data and many diagrams and maps, thus visualizing the main facts concretely. And instead of being issued after the complete reports it was published first, thus creating a wider popular interest in the results than had ever been aroused before. The enumerators employed on the 13th census, for population and agriculture, numbered 70,286, more than the combined populations of New York and Philadelphia in 1790; an organization not far inferior to the regular army in numbers. For the gathering of statistics on manufacturing, mines and quarries another 1,087 special agents were employed. At one time the clerks and officials employed in

the Washington office in compiling and tabulating the schedules numbered 3,738.

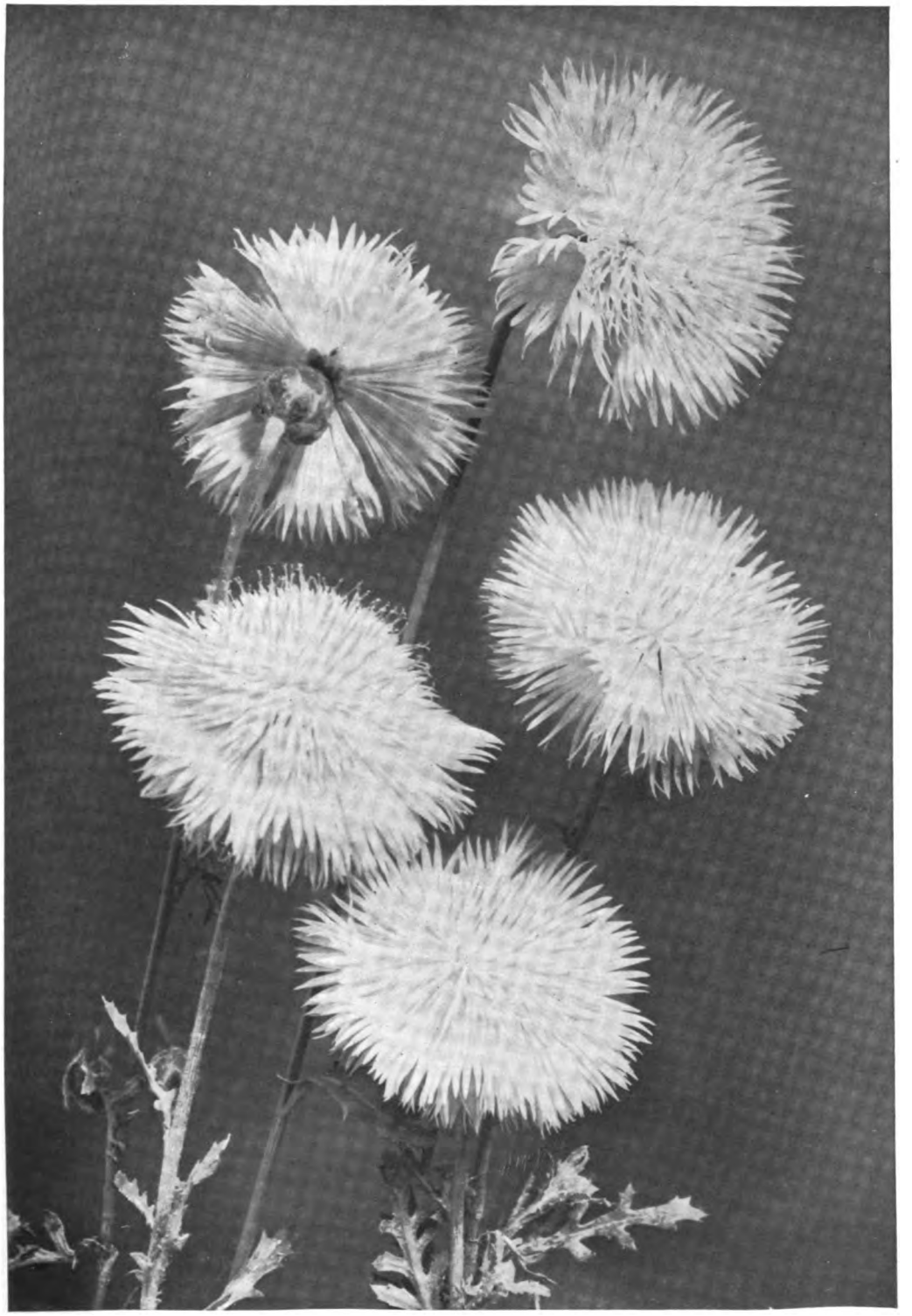
Aside from the taking of the main census, the Bureau of Census carries on many other inquiries, instituting investigations which require periods of from seven or eight years to two weeks. Chief of these are the decennial census of wealth, debt and taxation, showing the total assessed valuation of property subject to taxation; the census of religious bodies; the census of dependent, defective and delinquent classes, covering the inmates of benevolent institutions, insane asylums, penal institutions, etc.; and the annual collection of mortality statistics, to which it is expected soon to add the gathering of vital statistics. By the act of 1916 the director has an office of 569 employees, including a chief clerk, four chief statisticians, a geographer, eight chiefs of division, the rest being special agents and clerks.

State Censuses.— A number of States have constitutional requirements that a State census shall be taken once in 5 or in 10 years, or between two national censuses; but only a few pay any attention to the matter or attain results of any value. Massachusetts, Rhode Island, New York and Michigan thus far are the only States which have done good work in this line. The Massachusetts censuses from 1855 on, and the Michigan of 1874 and 1884, are notably good. On 3 March 1879 an act of Congress provided that any State which will take an interdecennial census in all respects equal to that of the United States, and file a copy with the Secretary of the Interior, shall receive from the national government 50 per cent of the amount paid to supervisors and enumerators, plus 50 per cent of the gain per cent in population between the two last preceding national censuses. Even this lure, however, has not thus far increased the interest of the States in their statistics. Consult 'Report of the Director of the Census' (in Report of Department of Commerce, 1915); 'Story of the Census: 1790–1915,' issued by the Bureau of the Census.

CENT, a United States coin and money of account, the 1-100 of a dollar. The convenience of decimal computation has caused in various countries the division of the monetary unit into hundredths, with names derived from Latin *centum* or its adjectives; as the French franc into centimes, the Dutch guilder into cents, the Italian lira into centesimos, the Spanish-American dollar into centavos, etc. Jefferson regularly used "cent" to mean the hundredth of any unit of measurement; but in its first suggestion for our coinage it meant 100. The inconvenience of the English system being felt, Congress in 1781 instructed Robert Morris to devise a system of national coinage; and he proposed a unit of ¼ grain of silver (or 1-1440 of a Spanish dollar, familiar in the colonies), of which 100 were to make a cent (about 7c. of ours), 500 a quint (34.7c.), and 10,000 a mark ($6.94). Jefferson proposed instead the dollar as the unit, the smallest coin to be of copper and 1-200 of it (that is, the old English farthing, our half-cent); this was adopted 6 July 1785. But on 8 Aug. 1786, an act was passed, still modeled by Jefferson, to coin a cent, of which 100 were to weigh 2¼ pounds avoirdupois (157.5 grains each), and be equal to a dollar, and a half-cent proportionate. This was the first use of the name in our coinage, and doubtless represents Jefferson's "hundredth." The "cents" prior to this have not that name on them, and are really English halfpence. The difficulty of displacing a popular name is shown by that of "penny," which still clings tenaciously though absurdly to our cent, only half its value. Congress in 1787 established a mint in New Haven, and for years coined there the "Fugio" or "Franklin" cents, familiar to collectors. But from 1785 to 1788 several States coined copper "cents" on their own account. Vermont (not yet admitted) began in June 1785; Connecticut in October 1785; Massachusetts late in 1786 (real cents and half-cents); New York, 1786; New Jersey, 1786 (coppers 15 to the shilling). Under the constitution the first coinage act was passed 2 April 1792, and raised the weight of the cent to 264 grains; but on 14 Jan. 1793, it was reduced to 208 and on 26 Jan. 1796 to 168, the half-cent always being proportional. The first coinage under the new act was in 1793. This old-fashioned "copper" remained unchanged except in pattern till 1857, and its forms from 1793 to 1857 are of seven types: (1) (1793), chain or link around the word "cent"; (2) 1793, wreath in place of chain; (3) 1793–96, liberty cap on pike over left shoulder of "Liberty"; (4) 1796–1807, "Liberty" with draped bust; (5) 1808–14, filleted head with 13 stars; (6) 1816–39, plain coronet with coiled hair; (7) 1839–57, same with braided hair. No cents were coined in 1815 or 1835. Those of 1799, 1793 and 1804 are very rare, as are also the *copper cent* of 1856 and the half-cents of 1793, 1831, 1840 to 1848 and 1852. On 3 March 1851, a 3-cent piece was authorized, of 12⅜ grains, 75 per cent silver, 25 copper, legal tender to 30 cents; on 3 March 1853, it was raised to .900 fine, but reduced to 11.52 grains, 3/50 of the half-dollar. On 21 Feb. 1857, the half-cent was abolished and the old cent replaced by a smaller new one, of 72 grains, .88 copper and .12 nickel. On 22 April 1864 this was supplanted by a bronze cent, 48 grains (the present one), .95 copper and .05 tin and zinc, legal tender to 10 cents; and a bronze 2-cent piece, twice its weight and legal tender. On 3 March 1865 a 3-cent piece was authorized, ¾ copper and ¼ nickel, 30 grains, legal tender to 60 cents; but the ones and twos were made legal tender to only four cents. On 16 May 1866 a 5-cent piece (the "nickel") was authorized, same material as the 3, 77.16 grains, legal tender to $1. On 12 Feb. 1873, all cents and their multiples were discarded except the 1, 3 and 5, as above, each to be legal tender to 25 cents; and on 26 Sept. 1890, the 3-cent piece was discarded. See NUMISMATICS.

CENT, a name given under the old Germanic constitution to a small portion of territory. Each province or district was subdivided into so many cents and was placed under the special jurisdiction of an overseer or centenarius. The name corresponds with hundred as in English territorial division.

CENT-GARDES, Les (Fr., "The Hundred Guardsmen"), a body-guard acting in the service of the French king during several centuries. See GUARDS.



Photograph by J. Horace McFarland Co.

CENTAUREA

CENT JOURS, săn zhoor, **Les** (Fr., "The Hundred Days"), the second period of the reign of Napoleon I, so called because it lasted precisely 100 days, from 20 March 1815, when he re-entered Paris on his return from Elba, to 28 June of the same year, when the second restoration was established.

CENT NOUVELLES NOUVELLES, săn noo-vĕl, a collection of facetious tales, first published at Paris in 1486. They were told at the table of the Dauphin, afterward Louis XI in the castle of Genappe during his exile. Their arrangement in their present form has been attributed to the Count of Croï, to Louis himself and to Antoine de La Salle. The latter, however, seems to have been the editor. The work is a curious example of a kind of literature distinctively French, and which, since its revival by Voltaire in the last century, has always been successfully cultivated: the literature that considers elegant mockery and perfection of form adequate compensation for lack of morality and lofty ideals. The historical importance of the collection arises from its giving details regarding the manners and customs of the 15th century that can be found nowhere else. They were first printed by Vérard (undated) from a manuscript of the year 1456. The 'Nouvelles' also show us that the Middle Ages are past, for among the narrators obscure and untitled men, probably domestics of the Duke of Burgundy, figure side by side with some of the greatest names in French history. They were edited in Paris in 1858 by Thomas Wright.

CENTAUREA, sĕn-tâ'rē-ą (commonly called BACHELOR'S-BUTTON, CORN-FLOWER, DUSTY-MILLER or KNAPWEED), a genus of annual or perennial herbs of the family *Asteraceæ*. There are about 500 much confused species, mostly natives of western Asia and the Mediterranean region. A few are found in the western hemisphere, but only one, *C. americana,* is native in the United States. This species, popularly called basket-flower, is a very attractive hardy annual with rose-colored flowers. Many of the species are widely used in ornamental gardening. The following are among the most popular garden sorts: *C. cyanus,* the blue-bottle or corn-flower, common in European grain fields and frequently found wild in America. Its blue flowers yield a blue dye. *C. cineraria,* the dusty-miller, has white-hairy leaves, and when grown as an edging plant—its most popular use—it is not allowed to flower. *C. moschata,* sweet sultan, is widely grown for its large, fragrant flower-heads. *C. montana,* mountain bluet, which originally had blue flowers, has developed various other tints under cultivation. All the species are easily grown from seed and thrive in any good garden soil.

CENTAURS, sĕn'tôrz, in Greek mythology, a fabulous race dwelling in Thessaly, on Mount Pelion. According to one of many fables, they sprang from the union of Ixion and a cloud. They were typical of wild savagery, except in the case of Pholus and Chiron. They are said to have been half horse and half man, and the fable is explained by the surprise of the Greeks on meeting with the wild horsemen of the northern tribes. Mythology relates the combats of the Centaurs with Hercules, Theseus and Pirithous. The latter, at the head of the Lapithæ, another Thessalian nation, their hereditary enemies, entirely defeated the Centaurs, killed many and drove them from Pelion. The Centaurs Nessus, Chiron and others are famous in fable. See CHIRON; DEJANIRA; HERCULES.

CENTAURUS, sĕn'tô-rŭs, or **THE CENTAUR,** a southern constellation, only a small part of which rises in our latitude. Two stars of the first magnitude are catalogued in the portion which does not appear above our horizon. This is one of the 48 ancient constellations formed by Ptolemy, who first discovered the likeness of a centaur in it. On the celestial maps of the Arabs it is represented by a bear mounted on horseback. The principal star in this constellation *a* Centauri, has been found to have a larger parallax than any other fixed star. The researches of Gill and Elkin made at the Cape of Good Hope Observatory in 1881–83 make the distance of this constellation 4.3 light years ("light year" meaning the distance traversed by light in one year).

CENTAURY, a genus of plants (*Centaurium*) of the family *Gentianaceæ,* of about 30 widely distributed species, mostly natives of western Asia and Europe, of which two are of distinct ornamental merit. One of these (*C. venustum*) is from California; the other (*C. massonii*) from the Azores. They are hardy little annuals with rose-colored flowers, and are frequently planted in rockeries, in the soil of which the seed may be sown in early spring. Some of the related species have been used to a small extent in domestic medicine, but rarely in regular medical practice. American centaury (*Sabbatia angularis*), of the same family, is widely distributed in rich soil and sunny situations from Ontario to the Gulf States. It is often cultivated for its cymes of fragrant showy white or rose-colored flowers. Like the above, it has been used to a small extent in domestic medicine for simple ailments.

CENTAVO, thĕn-tä'vō, a Chilean coin equivalent to the cent (q.v.).

CENTENARY, the commemoration of any event, as the birth of a great man, or the founding of a city or institution, which occurred 100 years before.

CENTENNIAL EXHIBITION, a World's Fair held in Philadelphia, Pa., from 10 May 1876 to 10 November of the same year. To celebrate the 100th anniversary of American independence, an association of Philadelphians in 1870 proposed an international exhibition of arts, manufactures and agricultural products, to be held in the city where independence was declared. Congress passed an act 3 March 1871, authorizing the exhibition and also appointed a commission of one member and an alternate from each State and Territory, nominated by the governors, to report on dates of opening and closing, plans for buildings, method of receiving and classifying articles, custom-house regulations. The commission was organized 4 March 1872, with Joseph R. Hawley of Connecticut as president; and on 12 May chose as director-general of the exhibition Alfred T. Goshorn. On 1 June Congress appointed a centennial board of finance, to raise funds for the

exhibition. This board was to solicit subscription to $10,000,000 of stock, and the corporators and subscribers were to elect 25 directors, who should apply the funds on the plans of the commission. Of 227,940 individual subscriptions, Pennsylvania gave $1,749,468. The city of Philadelphia added $1,500,000; the State of Pennsylvania $1,000,000 more. Then Congress appropriated $1,500,000, besides $500,000, for a government building. Fairmount Park was selected as the site, 236 acres being used for the purpose of the exhibition. The buildings of the exhibition proper consisted of the main building (for manufactured products, mines and metallurgy, the public works of all nations, and a conspectus of science and education), built of iron and glass with masonry foundations, 70 feet high, 1,880 x 464 feet, with central transept of 416 feet and two end transepts of 216; Machinery Hall, 1,402 x 360, of wood and glass on masonry foundations, occupying with an annex nearly 13 acres; Agricultural Hall, 820 x 540, of wood and glass; Horticultural Hall, built by the city of Philadelphia, a permanent structure of iron and glass in Moorish 12th-century style; Memorial Hall, intended as a permanent art gallery, of granite, glass and iron, in Renaissance style, 365 x 210 and 59 feet high, with a central tower 150 feet high, surmounted by a colossal statue; the United States Government Building, 504 x 306; the Women's Pavilion, an acre in extent, not only for the convenience of women, but for the collection and exhibition of their work; the Shoe and Leather Building and the Carriage Building, besides annexes. Moreover, 26 States erected buildings of their own, costing over $400,000; and a number of foreign countries, out of 49 which took part in the proceedings by invitation, erected their own buildings. There were over 200 separate buildings in all. The admission fee was 50 cents; 7,250,620 paid it in full, 753,654 paid a special 25-cent rate, and 1,906,692 went in free, making 9,910,966 admissions in all.

By the system of awards adopted the exhibits — to the number of over 50,000 — were divided into 36 groups, and these subdivided again and again into small sections. Each of the last was assigned to a special jury of awards, who had to make a statement in writing of the special merits they found in the articles which they esteemed best, and the uses for which each was best fitted, and to sign their names to the award: this left no room for carelessness or irresponsibility, and gave the maker the benefit of names of known weight. These judges numbered 233, of whom 118 were foreign and 115 Americans; included many of the ablest and most famous men of science and the professions and other great experts in the Western World; and the awards have been a source of just pride. Awards, consisting of a medal and diploma, were granted to 13,104 exhibitors, 7,802 of whom were foreign.

The exhibition was a most important landmark in the industrial history of the country, and other countries. Not only did it make later ones possible and successful here, but it diffused inventions, broke down stolid self-conceit and immeasurably advanced the knowledge of all the nations which took part in it. For instance, the Bell telephone was first exhibited there, and gained immediate celebrity from Sir William Thomson's enthusiastic praise; and the American bicycle manufacture sprang from Colonel Pope's inspection of English cycles there. It showed European countries with new clearness the marvels of American machinery-making, especially the immense development of mechanism with interchangeable parts, from watches to steam boilers and artillery. It made the first collection ever attempted of women's work on a large scale. It first made the beauty and grace of Japanese decoration and patterns popularly known. It shed new light on art principles in general. It illuminated educational systems with light from foreign sources. No public or private money was ever better invested than that devoted to creating and profiting by this collection. The official account of the exhibition was published in nine volumes by the government in 1880.

CENTENNIAL STATE, a popular name given to the State of Colorado on account of its admission to the Union in 1876, the 100th year of American independence.

CENTENO, Diego, dē-ā'gō thān-tā'nō, Spanish soldier: b. Ciudad-Rodrigo, Spain, about 1504; d. La Plata, upper Peru, 1549. Going to South America he accompanied Alvarado to Peru and soon became famous as a skilful fighter. He gained control of a part of the country by slaying the tyrant Almandras. In 1544 he took the part of the viceroy against Gonzalo Pizarro, but was defeated by Carbajal. His army was utterly routed and he himself was forced to flee. The Royalist cause aroused him and he collected an army at Charcas, but again suffered defeat by Pizarro and Carbajal. In the following year he assisted in the downfall of Pizarro and was appointed governor of Rio de la Plata, which office he held but a short time.

CENTER. See CENTRE.

CENTERVILLE, Iowa, city in Appanoose County, on the Rock Island, the Chicago, Burlington & Quincy and the Iowa Central railroads, 70 miles south of Des Moines. The town was settled in 1832 and was incorporated as a city in 1846. The city has a park, a public hospital and a public library. Coal, gypsum and limestone underlie the vicinity and large quantities are shipped. The exportation of live stock is an important industry, and there are railway shops and manufactures of lumber, flour, iron, skirts, crushed rock, etc. Pop. 6,936.

CENTESIMO. See COINS, FOREIGN, AMERICAN VALUES OF.

CENTIARE. See METRIC SYSTEM.

CENTIGRADE SCALE. See THERMOMETER.

CENTIGRAM, or CENTIGRAMME. See METRIC SYSTEM.

CENTILITER. See METRIC SYSTEM.

CENTIME. See COINS, FOREIGN, AMERICAN VALUES OF.

CENTIMETER, or CENTIMETRE. See METRIC SYSTEM.

CENTIMETER-GRAMME-SECOND SYSTEM. See UNITS.

CENTIPEDE, or **CENTIPED,** one of those myriapods (*Chilopoda*) with long, many-jointed, flattened bodies, each segment bearing only a single pair of appendages, which take the form of legs behind the head. The mouth-parts, besides a pair of jaws (mandibles), consist of two pairs of maxillæ, those of each pair being fused together in the middle. The first pair of legs are fused at their base, and form the poison-fangs, the poison-gland being situated in the base, and the poison oozing out of an orifice at the end of the leg. The single oviduct and corresponding male duct open at the end of the body in the penultimate segment. The centipedes (*Scolopendra*) are mostly confined to the tropics, a small species extending as far north as North Carolina. Those of the West Indies and the tropics in general are eight to nine inches in length, one species, however, attaining the length of 18 inches. Their bite is dangerous, quite as much so as the sting of the scorpion. They are ferocious when attacked or seized, biting energetically. In the Northern States the centipedes are represented by the species of *Lithobius* (*L. americanus*), which are wrongly called "earwigs," and live under stones, under the bark of fallen trees, etc. They prey on insects and worms. They have been observed to attack earthworms, grappling with them for several hours and, after killing them, sucking their blood. Very long, slender forms are *Geophilus* and its allies. The body is composed of from 19 to nearly 200 segments, each bearing a pair of legs. They are eyeless, and live buried in the sand, coming to the surface under stones.

The centipedes are hatched with numerous segments, and corresponding legs. Wood states that the female of a centipede (*Scolopocryptops sexspinosa*) guards her young by lying on her side, and then coiling her body, passes them along by a quick action of her feet, thus arranging them satisfactorily to herself. He also describes the manner of molting in this species.

The chilopods are more nearly related to the insects than are the millipedes. They are a less ancient group. No true *Chilopoda* are known to exist in rocks older than the Middle Tertiary period, species of *Cermatia, Scolopendra, Lithobius* and *Geophilus,* having been detected in amber and the gypsum beds of Aix, Provence, France, of Oligocene age. (See CHILOPODA). Consult Latzel, 'Die Myriapoden der Oestreschisch-Ungarischen Monarchie' (Wien 1880); Korschelt and Heider, 'Lehrbuch der vergleichenden Entwickelungsgeschichte der wirbellosen Thiere' (Jena 1891); Sinclair, articles on Myriapods, 'Cambridge Natural History' (Vol. V, London 1895); Zittel, 'Handbuch der Palæontologie' (I Abth., II Bd., Leipzig 1881–85); Wood, 'The Myriapoda of North America' ('Transactions,' Amer. Phil. Soc., Philadelphia 1865).

CENTLIVRE, sănt-lēvr, **Susanna Freeman,** English actress and dramatist: b. Ireland about 1667; d. London, 1 Dec. 1723. When very young she married a nephew of Sir Stephen Fox. Becoming a widow within a year she took for a second husband an officer of the army of the name of Carrol, who was killed in a duel the second year of their wedlock. This event in her singular career reduced her to considerable distress, and led her to attempt dramatic composition. Her first production was a tragedy entitled the 'Perjured Husband,' performed in 1700. This was followed by several comedies, chiefly translations from the French, which exhibited the vivacity that distinguishes her literary character, and met with some temporary success. She also tried the stage as an actress on the provincial boards, and by that means attracted the attention of her third and last husband, Mr. Centlivre, Queen Anne's head cook, whom she married in 1706. She still continued writing for the stage, and produced several more comedies. Some of these remain stock pieces, of which number are 'The Busy Body'; 'The Wonder'; and 'A Bold Stroke for a Wife.' They are diverting from the variety of incident and the liveliness of the characters, but want the accompaniments of adequate language and forcible delineation. They partook of the license of the age. Mrs. Centlivre enjoyed the friendship of Steele, Farquhar, Rowe and other wits of the day. Having, however, offended Pope, she obtained a place in the Dunciad, but is introduced by no means characteristically. An edition of her works with a biography appended appeared in 1872.

CENTNER, a German weight, in common use on the continent of Europe, which is nearly the equivalent of the British hundredweight. It formerly varied in the different German states, but since the introduction of the metric system of weights and measures into the German empire, 1 Jan. 1872, the value of the centner has been fixed at 50 kilograms, or 100 German pounds, equivalent to 110.23 pounds avoirdupois. In Austria it is equal to 110½ pounds, and in Sweeden to 112.06 pounds.

CENTO, chĕn'tō, Italy, city 13 miles north of Bologna, on the eastern bank of the canal of Cento and near the river Reno. It is surrounded by a rampart and ditch and contains several churches, convents and a cathedral. The celebrated painter, G. F. Barbieri, commonly called Guercino, was born here about 1590. A statue of him stands in front of the Palazzo Governativo. The gates of the ancient town have been preserved. It has a hemp and rice market. Pop. 23,907.

CENTO, sĕn'tō (Latin, "patchwork"), originally a cloak made of patches; hence, as Lessing observes, the dress of Harlequin is called in Apuleius *mimi centuculus.* The term has been transferred to such poems as have been formed out of verses taken from other poems. It was a particular art to combine passages of different authors on different subjects in this manner so as to form a regular whole. Thus there were in early times Virgilian centos (*centones virgiliani*), in which most of the verses were taken from Virgil; for instance the 'Cento Nuptialis' of Ausonius, and centos from the verses of Homer (*Homerici centones*). It was a favorite pastime in the Middle Ages. Consult Delepierre, 'Tableau de la littérature du centon' (London 1874–75).

CENTRAL AFRICA PROTECTORATE. See NYASALAND PROTECTORATE.

CENTRAL AMERICA. Though on the map Central America appears to be a mere isthmus extending in a southeasterly direction from Mexico to Colombia, between the Caribbean Sea and the Pacific Ocean, it is in fact structurally much more nearly related to the

West Indies, including the Gulf of Mexico and the Caribbean Sea, and to the northern coast of South America, than to the main bodies of the larger continents. It has a distinct geologic formation at right angles to those of North and South America. Probably in the Tertiary Period Central America and the Antilles together formed a great island or archipelago lying between North and South America. (Consult Robert T. Hill's 'Cuba and Porto Rico,' etc.). Guatemala, Honduras, Salvador, Nicaragua and Costa Rica, five republics, are characterized in the treaty of peace signed at Corinto, Nicaragua, 20 Jan. 1902, as "the Central American family." The Isthmus of Panamá, at the commencement of its history under the Spanish régime, was associated not less intimately with the settlements in the region north and west of it than with those of South America; British Honduras (Belize) also, a colony lying between Guatemala and the Caribbean Sea, has been connected about equally with the history of the Central American states and with that of Yucatan. The mountains described as extending directly at right angles to the cordilleras of North and South America are part of a great Antillean system. East and west mountain ranges of this type occur in the Isthmus of Panamá, Costa Rica and the eastern parts of Nicaragua, Honduras, Guatemala and the adjoining provinces of Mexico, also along the Colombian and Venezuelan coast of South America, and in Cuba, Haiti and the other islands of the Greater Antilles. Two submarine ridges stretching across the Caribbean Sea, between Honduras and the Sierra Maestra range in Cuba, and from Cape Gracias á Dios to Jamaica, are regarded as being genetically a part of the same system. The great banks of the western Caribbean Sea were at one time projections of land probably connecting Central America with Jamaica and possibly Cuba. Therefore Florida, the Bahamas, the Antilles and at least the eastern part of Central America, totally severed from North and South America, together formed either one great island, or, more probably, a group of several large islands, with volcanic chains on the east and west, and with characteristic rocks, calcareous and igneous, which have weathered into soils of unsurpassed fertility. A Central American group of volcanoes, with 31 active craters crossing the western ends of the Antillean folds, occurs on the Pacific side of the republics, from Costa Rica to Guatemala. The central and eastern region is well watered, with comparatively low mountains, very rich soil, and a good climate, except the Caribbean coast which, from Trujillo downward, including the Mosquito territory, is hot and insalubrious. Lack of communication and means of transportation has led to the abandonment of the intermediate lands, the most attractive and extensive part of the country, nearly or quite beyond the influence of the volcanic area. The easily approachable volcanic strip (in Nicaragua, for example, between the lakes and the Pacific) has been preferred hitherto as a place of residence. Thus one who visits only the principal cities in the centre of population, seeing nothing of the naturally richer and better districts, receives the impression that this is the most volcanic region of the globe. The largest volcanoes are, for example in the north, the Acatenango, 14,000 feet elevation, in Guatemala; and in the south, for example, the Irazú and Turealba, of 12,000 feet, in Costa Rica. In Nicaragua the highest, El Viejo, is only 5,800 feet above sea-level. In Guatemala we find the volcanoes, Fuego, Cerro Quemado and El Chato; in Salvador, Ilopango and San Salvador. Earthquake shocks in the republics last mentioned, and also in Costa Rica, have been, as a rule, very severe, while those of Nicaragua are comparatively mild and extend over limited areas. The recorded seismic disturbances that have affected the whole country are those of 1538, 1648, 1651, 1844 and 1865. Central Nicaragua, east of the lakes, Nicaragua and Managua (the largest bodies of fresh water in Central America), is regarded as nearly immune from such disturbances. Nicaragua's centre of volcanic activity is a ridge, the Sierra de los Morabios, between the Cosigüina (whose outburst on 2 Jan. 1835 was considered the grandest on record before the eruption of Krakato in 1883), and the Momotombo. In this ridge are 10 vents, two of which, the Telica and Momotombo, are active and none can be properly called extinct. Southeast from the Morabios ridge is the isolated active volcano Masaya. The Orosé is in Costa Rican territory. The island of Ometepe in Lake Nicaragua has two volcanoes, one dormant, the other extinct. Comparatively few members of the Central American chain of volcanoes are of the type with which fierce eruptions are commonly associated; moreover, the fertility of the soil on their flanks, due to the high percentage of soda and potash contained in volcanic dust, tempts agriculturists to remain in this neighborhood. The line of the intercontinental railway keeps near to the Pacific coast, and it is probable, therefore, that for many years to come the best part of Central America, the central districts, will receive only secondary consideration, remaining comparatively undeveloped.

History.— Rodrigo de Bastidas, a notary of Triana, was the first Spaniard to explore any portion of the Caribbean coast of Central America. He embarked at Cádiz in October 1500; and, after reaching the mainland of South America near the present Venezuelan boundary, coasted westward and made observations of the isthmus from a point below Darien to Nombre de Dios. Columbus, on the fourth voyage to America, sailing from Cádiz, 9 May 1502, and stopping at Santo Domingo on the way, arrived off the shore of Honduras, 30 July. There he heard reports of the wealth of Mexico, but decided to continue the voyage southward, searching for a strait that should lead across terra firma to India. Thus he and his companions, including his son and brother, passed a cape to which they gave the name Gracias á Dios, and on 25 September, reached the river San Juan de Nicaragua, and heard stories from the natives which made them believe they were within a nine-days' journey of a splendid land, such as Marco Polo had described in his account of travels in Asia, and that the river Ganges lay only a little beyond. On 7 October they came to the beautiful Laguna de Chiriquí, and on the adjoining Veragua coast they obtained a large amount of gold by trading with the natives. Columbus lingered in the immediate neighborhood of the Chagre (now

CENTRAL AMERICA
SCALES
Statute Miles, 88 — 1 Inch.
0 10 20 30 40 50 75 100 150 200
Kilometres, 142.— 1 Inch.
0 25 50 75 100 200 300
Rand McNally's New 11 x 14 Map of Central America.
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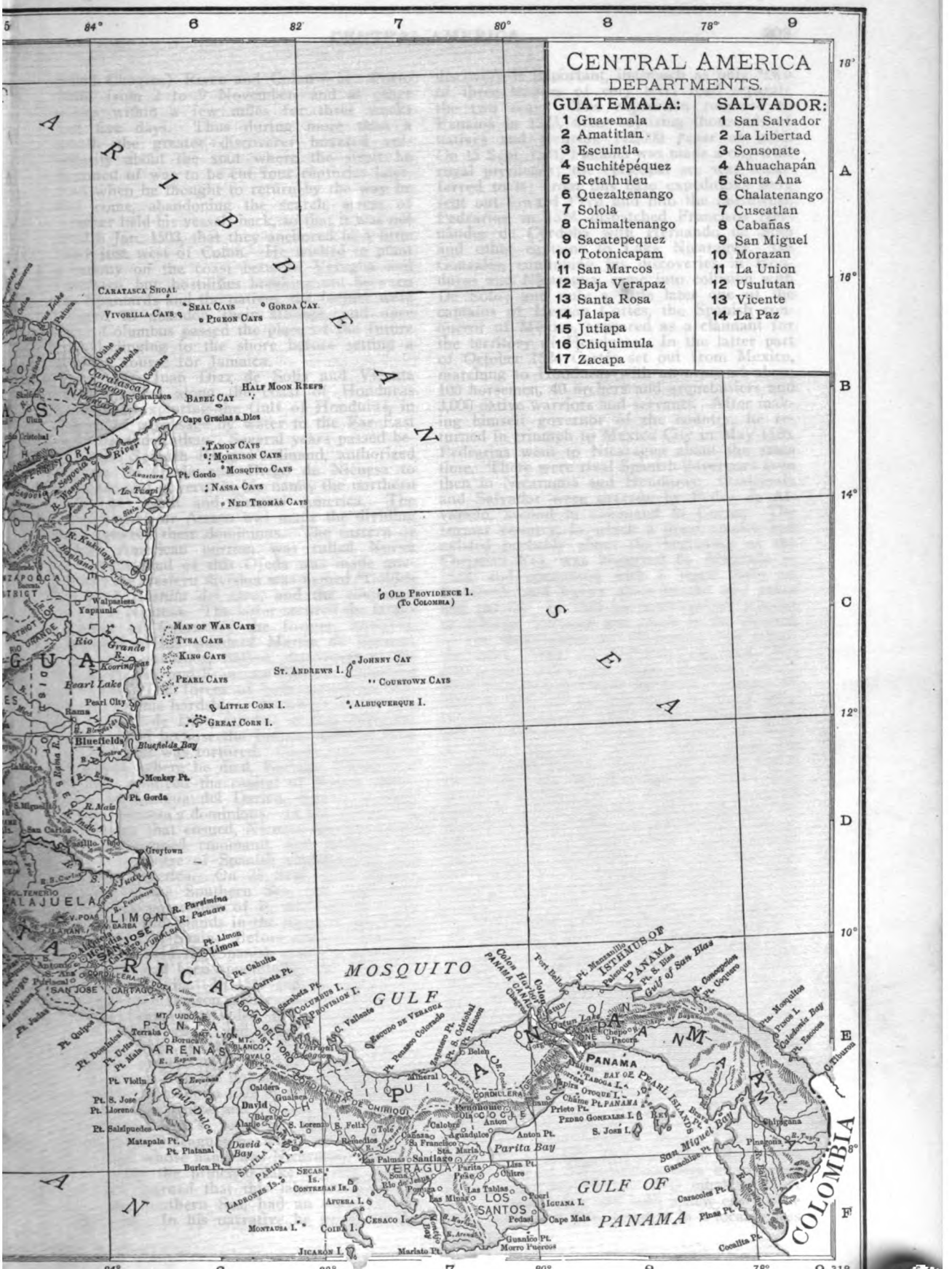
MEXICO
GUATEMALA
BRITISH HONDURAS
BELIZE
HONDURAS
SALVADOR
NICARAGUA
COSTA RICA
PACIFIC OCEAN
GULF OF HONDURAS
Gulf of Fonseca
Sta. Elena
Orange Walk
San Estevan
Rio Hondo
Rio Grande
Rio Azul
Rio Hondo
Rio Bravo
Rio Usumacinta
Rio Pasion
Rio de la Pasion
Rio Chixoy
Rio Salinas
Rio Chacamas
Rio Jataté
Rio Chixoy
Rio Chipotes
Rio S. Isabel
Rio Motagua
Rio Polochic
Rio Dulce
Rio Sarstoon
Rio Belize
Rio Hondo
Rio Aguan
Rio Ulua
Rio Chamelecon
Rio Santiago
Rio Ulua
Rio Lempa
Rio Goascoran
Rio Choluteca
Rio Negro
Rio Grande
Rio Tinto
Rio Escondido
Rio Prinzapolka
Rio Coco
Rio Wanks
Rio Patuca
Rio Aguan
Rio Sico
Rio Platano
Rio Romano
Rio Tinto
Rio Grande
Rio Tuma


CENTRAL AMERICA
DEPARTMENTS.
GUATEMALA:
1 Guatemala
2 Amatitlan
3 Escuintla
4 Suchitépéquez
5 Retalhuleu
6 Quezaltenango
7 Solola
8 Chimaltenango
9 Sacatepequez
10 Totonicapam
11 San Marcos
12 Baja Verapaz
13 Santa Rosa
14 Jalapa
15 Jutiapa
16 Chiquimula
17 Zacapa
SALVADOR:
1 San Salvador
2 La Libertad
3 Sonsonate
4 Ahuachapán
5 Santa Ana
6 Chalatenango
7 Cuscatlan
8 Cabañas
9 San Miguel
10 Morazan
11 La Union
12 Usulutan
13 Vicente
14 La Paz
CARIBBEAN SEA
PACIFIC OCEAN
MOSQUITO GULF
GULF OF PANAMA
COLOMBIA
NICARAGUA
COSTA RICA
PANAMA
GUATEMALA
HONDURAS
SALVADOR
CARATASCA SHOAL
VIVORILLA CAYS
SEAL CAYS
PIGEON CAYS
GORDA CAY
HALF MOON REEFS
BABEL CAY
Cape Gracias a Dios
TAMON CAYS
MORRISON CAYS
MOSQUITO CAYS
NASSA CAYS
NED THOMAS CAYS
OLD PROVIDENCE I.
(To Colombia)
MAN OF WAR CAYS
TYRA CAYS
KING CAYS
PEARL CAYS
ST. ANDREWS I.
JOHNNY CAY
COURTOWN CAYS
ALBUQUERQUE I.
LITTLE CORN I.
GREAT CORN I.
Bluefields
Bluefields Bay
Monkey Pt.
Pt. Gorda
Greytown
Pt. Limon
Limon
Pt. Cahuita
Carrera Pt.
Barbeda Pt.
COLUMBUS I.
PROVINCION I.
C. Vallenato
Escudo de Veraga
Pt. Pescado Colorado
Pt. S. Cristobal
Pt. Hicacos
Pt. Belen
Colon
Port Bello
Pt. Manzanillo
ISTHMUS OF PANAMA
Pt. S. Elias
Gulf of San Blas
Pt. Concepcion
Pt. Copiare
Pt. Mosquitos
Pinos I.
Caledonia Bay
Pt. Escocs
C. Tiburon
Panama
Taboga I.
Toque I.
Prieto Pt.
Pedro Gonzales I.
Pt. Panama
Chame Pt.
Cordillera
Parita Bay
Pinogana
Garachine Pt.
San Miguel Bay
Caracoles Pt.
Pinas Pt.
Coralita Pt.
Cape Mala
Pedasi
Morro Puercos
Guanico Pt.
Mariato Pt.
Montauba I.
Coiba I.
Cebaco I.
Jicaron I.
Iguana I.
Las Palmas
Santiago
Las Tablas
Los Santos
Veraguas
Chiriqui
Bocas del Toro
Almirante
Chiriqui Lagoon
Changuinola
Sixaola
Talamanca
Chiriqui Viejo
Volcan de Chiriqui
Mt. Duran
Mt. Blanco
Mt. Lyon
Mt. Dulce Nombre
Mt. Utyum
Mt. Kemedy
Mt. Loma
Mt. Dupplanel
Mt. Quipes
Mt. Violin
Mt. Sta. Fe
Mt. Sta. Maria
Mt. Sta. Cruz
Mt. Sta. Rosa
Mt. Sta. Clara
Mt. Sta. Ana
Mt. Sta. Isabel
Mt. Sta. Teresa
Mt. Sta. Barbara
Mt. Sta. Catalina
Mt. Sta. Lucia
Mt. Sta. Margarita
Mt. Sta. Inez
Mt. Sta. Agueda
Mt. Sta. Apolonia

called Chagres) River and Colon — at Porto Bello from 2 to 9 November, and at other points within a few miles for three weeks and five days. Thus during more than a month the greater discoverer hovered voluntarily about the spot where the strait he dreamed of was to be cut four centuries later. And when he thought to return by the way he had come, abandoning the search, stress of weather held his vessels back, so that it was not until 6 Jan. 1503, that they anchored in a little river just west of Colon. He wished to plant a colony on the coast between Veragua and Cerebaro, but, hostilities breaking out between the Spaniards and the natives, the former were obliged to abandon their attempt, and once more Columbus passed the place of the future canal, clinging to the shore before setting a straight course for Jamaica.

In 1506 Juan Diaz de Solís and Vicente Pinzón sailed along the coast of Honduras westward, exploring the Gulf of Honduras, in search of a passage by water to the Far East — India and Cathay. Several years passed before the Spanish King, Ferdinand, authorized Alonzo de Ojeda and Diego de Nicuesa to colonize and govern, in his name, the northern coast of South and Central America. The river Darien or Atrato was made the dividing line between their dominions. The eastern or South American portion was called Nueva Andalucia, and of this Ojeda was made governor; the western division was named "Golden Castile," *Castilla del Oro,* and the command given to Nicuesa. The latter secured the larger number of followers; the former, however, attracted to his standard Martin de Encisco, afterward governor, Balboa, discoverer of the Southern Sea, and Francisco Pizarro, conqueror of Peru. The forces of both governors suffered extreme hardships. Nicuesa's capital was at Nombre de Dios, Ojeda's at San Sebastian — so named because the Indians afflicted them as that saint was tortured. Ojeda returning to Española, where he died, Encisco, Balboa and Pizarro removed the capital of Nueva Andalucia to Antigua del Darien, that is, a point within Nicuesa's dominions. In the contest for supremacy that ensued, Nicuesa was the loser. Balboa assumed command, and Antigua became the centre of Spanish enterprise in that part of America. On 25 Sept. 1513, Balboa discovered the Southern Sea, and four days later took possession of it, with all its lands and ports and islands in the name of the King and Queen of Spain. Before news of this discovery reached the Spanish court, a successor to Balboa had been appointed in the person of Pedrarias Dávila. In 1517 Balboa was falsely charged with treason, and executed. Pedrarias Dávila, being superseded in command, went to the south coast and founded the city of Panamá (that is, the old Panamá, six miles from the present city), 15 Aug. 1519.

A voyage into the unknown northwest from Panamá was made in 1522 by Gil Gonzáles, who explored the Dulce and Nicoya gulfs indenting Costa Rica's southern shore. Thence northward 50 leagues he went, to the domain of a chief whose name was Nicaragua, and who dwelt near the principal lake of that region. Gonzáles learned that this lake, though lying near the Southern Sea, had an outlet to the Caribbean. In his narrative he says that the discovery is important, inasmuch as only "two or three leagues of very level road separate the two seas." The expedition returned to Panamá in 1523, after baptizing thousands of natives and securing 112,000 *pesos* of gold. On 15 Sept. 1521, Panamá was made a city with royal privileges; the episcopal see was transferred to it; from this base expeditions were sent out toward Peru and into the northwest. Pedrarias, in 1524, dispatched Francisco Hernández de Córdoba with Hernando de Soto and other captains to Lake Nicaragua. Gil Gonzáles, continuing his discoveries in Honduras and Nicaragua, came into collision with De Soto; and only a little later one of the captains of Hernán Cortés, the Spanish conqueror of Mexico, appeared as a claimant for the territory of Honduras. In the latter part of October 1524 Cortés set out from Mexico, marching to Honduras with an army of about 100 horsemen, 40 archers and arquebusiers and 3,000 native warriors and servants. After making himself governor of the country, he returned in triumph to Mexico City in May 1526. Pedrarias went to Nicaragua about the same time. There were rival Spanish governors even then in Nicaragua and Honduras. Guatemala and Salvador were overrun by Pedro de Alvarado, second in command to Cortés. The former country, in which a great empire had existed probably about the beginning of the Christian Era, was inspected by Alvarado in 1522, and conquered with a small force of Spaniards and native allies before two years had passed. In 1535 an unsuccessful attempt to colonize Veragua was made in the interest of the descendants of Columbus (on whom the titles, "Duke of Veragua," etc., had been conferred), and a still more calamitous enterprise was that of Diego Gutiérrez, a citizen of Madrid who led an expedition to Costa Rica north of Veragua in 1540. Francis Drake, English privateersman, attacked Nombre de Dios in 1572. Again, in 1595, Drake (now Sir Francis, knighted for his feat of sailing round the world), Sir John Hawkins and others took Nombre de Dios; but an English force of 750 men sent to attack Panamá was defeated by the Spaniards when half-way across the isthmus. Drake, dying on 28 Jan. 1596, was buried off Porto Bello. The conquest of Costa Rica was undertaken by Nicaraguan Spaniards in 1560. Partial success rewarded the efforts of the soldiers; meanwhile, however, great progress had been made in the pacification of that province by the efforts of Franciscan friars.

Captain William Parker, sailing from Plymouth in November 1601, captured Porto Bello. In December 1616 the King of Spain informed the governor of Castilla del Oro that he and the commercial world believed that communication might be established easily between the oceans by constructing a canal. This was the century of English depredations and of Spanish idle dreaming, Spain's centuries of vigorous expansion having passed. In 1668 the Welsh buccaneer Morgan plundered Porto Bello, his foul cruelty rivaling any Spanish misdeed in this blood-stained region. Three years later, having at his disposal a fleet of 37 ships and a force of 2,000 fighting men, he captured Panamá (January 1671). The inhabitants set fire to their homes, and built a new city of the same name at a little distance in a locality less

exposed to attack. That was the beginning of the present city of Panamá. Granada, in Nicaragua, was sacked by French and English pirates in 1686. A number of influential Scotchmen, chief of whom was William Paterson, the founder of the Bank of England, were authorized by the Scottish Parliament in 1695 to found colonies in savage lands. They afterward obtained letters patent from William III of England. Paterson chose Darien, believing the control of the traffic of the isthmus to be essential to the prosperity of England; he certainly was not, as is incorrectly and commonly stated, merely anxious to make money for his company, and reckless of consequences to the colonists. (Consult Bannister's 'Life'; Rodriguez's 'Anexión de Cuba,' etc.). The largest and most costly expedition that had yet been fitted out for colonization in America sailed from Leith, 26 July 1698, and founded "New Saint Andrew." Subsequently recruits were sent out to them; but the project came to a miserable end. More than 2,000 lives and several millions of money had been lost, when the survivors were starved into surrender by the Spaniards. A British squadron commanded by Adm. Edward Vernon (21 Nov. 1739), took Porto Bello, but was defeated at Cartagena. Meanwhile English settlements of a very peculiar character had been begun in Mosquitia and at Belize. The Misskito tribe, called by the Spanish and English "Sambos" or "Mosquitos," a hybrid people, descendants of fugitive slaves, "Cimarrones," and natives, ruled by an hereditary king, dwelt on the eastern coast of Honduras and Nicaragua in the 17th century. Unoccupied by the Spanish, this coast was frequented by buccaneers, who made Cape Gracias à Dios, on the dividing line between the colonies just mentioned, their rendezvous. Small settlements of English adventurers existed in this region. By the Treaty of Madrid (1670) certain rights were conceded to Great Britain, and the British claim was asserted (1744) by sending troops and building forts, but it was withdrawn (1786) when an agreement was reached as to the cession by Spain of the territory on the north coast of the Gulf of Honduras. The ex-freebooters of Belize, reinforced by other adventurers, were able to exploit the rich forests and hold their own, or more, in the contest for the possession of this territory waged at intervals between the authorities at Yucatan and the wood-cutters (regarded as interlopers) from 1733 until the end of the 18th century. The Treaty of Versailles (1783) defined the limits of Belize; but these were more precisely stated in the treaty signed at London, 14 July 1786. The boundaries were subsequently extended by encroachments of the wood-cutters. Thus England, retaining the region now known as the colony of British Honduras, abandoned possession of the Mosquito coast, though her claim to exercise a certain degree of influence in the latter territory (from which the Spaniards were expelled by the Sambos in 1796) was not expressly and absolutely surrendered until the middle of the 19th century. Before that determination, several reverses were sustained in Nicaragua. An English force was repulsed at Fort San Carlos in 1769. A few years later the design to sunder the Spanish provinces of Central America, and, at the same time, to capture a route for an interoceanic canal, by taking possession of Lake Nicaragua and the cities of Granada and Leon (Consult Bancroft's 'Central America'), proved infeasible. An English force of about 1,800 men, including a party of marines under Horatio Nelson, was forced by the deadly fevers to abandon the attempt.

Except Belize, Mosquitia, and large tracts in which the Indians remained nearly undisturbed, Spain now held the land, but no longer had energy or opportunity to develop its natural resources. The natives, more docile and serviceable than in other parts of America, seldom increased the difficulties of the situation by uprisings; there was, however, little incentive to accumulate property in a land menaced constantly for a hundred years by English, Dutch and French pirates. The several divisions of an apathetic population were easily drawn together for administrative purposes. The captain-general of Guatemala, by the middle of the 18th century, controlled the provinces of Costa Rica, Honduras, Nicaragua and Salvador, beside others now within Mexican boundaries. Revolt against Spain was the form in which the spirit of the people, awakened from this lethargy, naturally expressed itself. Unfortunately armed revolt has ever since been too closely identified with progress in the popular conception. The first weak blow for Central American freedom was struck in San Salvador, 5 Nov. 1811. A sequel to this attempt (in Leon, Nicaragua, 13 Dec. 1811) duplicated this Salvadorean effort, in result as in motive. A third failure was recorded when the Colombian insurgents (1820) fitted out a combined sea and land expedition to operate against the towns of Omoa and Trujillo. The Isthmus of Panama cast in its lot with South America, rather than with Central America, by voluntary annexation to the republic of Colombia on 28 Nov. 1821. (For its subsequent history see COLOMBIA and PANAMÁ). The declaration of independence at the city of Guatemala, 15 Sept. 1821, was little more than an echo of the triumphant cry of other Spanish-American colonies in revolt. It was followed (5 Jan. 1822), by a decree of the *junta directiva* annexing Central America to Mexico. Salvador refusing to join in this surrender, a war with Guatemala ensued. Before 18 months had passed the Central American provinces resolved to form a union and constitute a single nation. On 1 July 1823 a national constituent assembly expressed this purpose, the name chosen for the nation being *Provincias Unidas del Centro de América.* Though laggards in the race to win freedom, the Central Americans were prompt in bestowing it. The laws of 31 Dec. 1823, and 17 and 24 April 1824, emancipated their slaves and declared that slaves of other countries on coming to Central America should be freed. When dissensions and civil war broke up their confederacy, they had at least taken one step forward, in advance of their neighbors. The congressional decree of 30 May 1838, granting to the states the privilege of unrestrained action in most important matters, practically dissolved the union, though Salvador tried to maintain or renew it long after the other confederates had withdrawn. Nicaragua, on recovering her autonomy, became involved in a dispute with

Great Britain, the latter upholding the claim of the Mosquito King to all the territory lying between Cape Gracias á Dios and the mouth of the San Juan River, and sending (January 1848) two warships to occupy the port of San Juan. Nicaragua yielded provisionally to superior force. At this point the intervention of the United States was felt; and soon afterward the Clayton-Bulwer Treaty, concluded at Washington 19 April 1850, between the United States and Great Britain, provided that neither power should occupy, fortify, colonize or exercise dominion over any portion of Central American territory (except Belize), or make use of a protectorate in any form. This treaty guarantees Central American independence and encourages the maintenance of English influence, which was considered beneficial within certain limits. By the Zeledon-Wyke Treaty of 28 Jan. 1860, England ceded to Nicaragua absolutely the protectorate over the Mosquito coast. While the diplomacy of the government of the United States was in the main considerate and helpful at this time, the conduct of some of her citizens left much to be desired. San Juan del Norte, or Greytown, was bombarded by the United States sloop-of-war *Cyane*, and burned to the ground by a landing party from that vessel, on 13 July 1854 (see WALKER, WILLIAM). Renewal of the efforts to achieve Central American unity was due, in a measure, to President Barrios of Guatemala (1873–85). For the further development of this design; the attempt (1895–98) to unite Honduras, Nicaragua and Salvador; the treaty of 20 Jan. 1902, and events of the years 1885 to 1916, see the separate articles on each of the five Central American republics.

All the Central American countries sent delegates to a conference held in Washington, D. C., 14 Nov. to 20 Dec. 1907. As a result of their deliberations eight conventions were signed, in relation to a general treaty of peace and amity, the establishment of a Central American Court of Justice, of an international bureau, of a pedagogical institute also international in design, etc. The Central American Court of Justice was opened at Cartago, Costa Rica, 26 May 1908 in the presence of representatives of the five Central American nations, of the United States and of Mexico. This international court is now established at San José, Costa Rica. On 20 Jan. 1909 a meeting at Tegucigalpa, Honduras, was attended by delegates of the five nations and an agreement was framed to secure the unification of the monetary systems, customs duties, weights and measures, fiscal laws and consular service. This was the year of the Zelaya episode (see NICARAGUA — HISTORY). Other happenings served to concentrate attention upon Nicaragua, which during the latter part of the summer and the entire autumn of 1912 was in a state of revolution which imperiled the lives and property of foreigners and so led to intervention by the United States. In January 1914 another conference took place, which carried even further the recommendations of the conference of 1909 and added plans for agreements as to international highways, postal and telegraphic regulations, and coasting trade, as well as the founding of a central pedagogic institute and a central mission of foreign relations. Although no united action had, up to February 1917, been taken to put in operation the plans of these conferences, good influences were at work making for a better understanding of the essential community of interests and responsibilities and bringing nearer to realization the stabilization of financial and political conditions. Thus, the convention between the United States and Nicaragua, proclaimed 24 June 1916, served to call attention to the need of increasing eventually the solidarity of Nicaragua, Honduras, El Salvador and Costa Rica; while the establishment of banks in Central America, with the aid of capitalists in the United States, has proved the power of such organizations to aid regular and orderly development throughout all that region, wherever transportation routes can be maintained with reasonable economy. Consult 'Nicaraguan Canal Route' (Treaty Series, No. 624, Washington 1916) and 'Proceedings of the First Pan American Financial Conference' (especially pages 583–87, Washington 1915).

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MARRION WILCOX.

CENTRAL AMERICA, Diplomatic Relations with.— The earlier general interest of the United States in Latin America was first attracted to a larger consideration of the problems relating to Central America under Monroe's administration, which in 1818 had an opportunity to consider suggestions for establishing the southern limit of the United States at the Isthmus of Panama, in 1819 completed the establishment of the United States as a Gulf power by the acquisition of Florida, in 1822 recognized the extinguishment of direct Spanish interests in Mexico, and in 1823 received from Salvador diplomatic overtures for annexation or a protectorate — overtures which were later withdrawn by the disappearance of the danger of forced annexation to Mexico.

In 1823, with consent of Mexico the five Central American states were united into a national federation which subsequently adopted

a constitution on the model of that of the United States and borrowed the code of Louisiana.

Central American commissioners presented their credentials at Washington 10 Sept 1823. In 1824, Secretary Adams instructed Thomas N. Mann to visit Guatemala to obtain statistics and political information; and in 1825 the American government recognized the Federation of Central America, which in the same year was also recognized by Great Britain and the Netherlands. The first American diplomatic agent to the Federation, John Williams, was commissioned on 29 Dec. 1825; and the last American representative to the Federation, appointed in 1841, left his post in March 1842. The last Federation representative at Washington took his leave 16 March 1828.

On 5 Dec. 1825, the United States negotiated with the Federation a treaty of commerce which expired by its own limitations in 1837 and was never renewed. In April 1825, the American government received from Canaz, the representative of the Federation, a proposal of co-operation in promoting the opening of a canal through Nicaragua, and, in 1826, through the influence of Mr. Williams, the Central American government contracted with A. H. Palmer of New York for the construction of the canal; but failure of plans caused Central America to open negotiations with a Holland company, whose plans failed by the political disturbances in connection with the separation of Belgium from Holland in 1830.

As a result of rebellions, the Federation was partially ended by 1833. It was practically dissolved by 1839 by the legislative decree of 1838 granting each member of the Union the privilege of unrestrained action in the most important matters, and completely dissolved by 1847.

After the complete dissolution of the Federation American diplomatic representatives to the separate republics were first sent to Guatemala in 1848, to Salvador in 1849, to Nicaragua in 1851, to Costa Rica in 1852 and to Honduras in 1853. Diplomatic representatives of the separate Central American states were received at Washington from Nicaragua in 1849, from Costa Rica in 1851, from Guatemala in 1851, from Salvador in 1853 and from Honduras in 1854. A commercial treaty was negotiated with Costa Rica in 1851. A similar treaty, negotiated with Nicaragua in 1849 and at subsequent periods, did not become operative.

Active American diplomacy affecting Central America really began with the military occupation of California and the resulting Colombia treaty of 1846 which was ratified in June 1848. The motive which attracted the American government to exercise a larger influence over the region was associated with the problem of the establishment and proper control of a new route to California. It was also connected with the development of canal plans by Louis Napoleon between 1844 and 1848, and consequent competitive English operations and plans in Central America, especially the occupation of the Nicaraguan port of San Juan (Greytown) which precipitated the intervention of American diplomacy and the negotiation of the famous Clayton-Bulwer Treaty (q.v.) of 1850 which guaranteed the integrity and independence of Central American territory and prepared the way for the extinguishment of any British claim of sovereignty or protectorate over the Mosquito Indians along the coast of Nicaragua — a claim which was finally terminated by the English treaty negotiated by Wyke with Nicaragua in January 1860. On questions connected with these negotiations Central America requested and welcomed the support of the United States.

Boundary questions between Central American states furnished an opportunity for England to assert her earlier territorial claim. In 1852 Webster, acting under friendly mediation of the American government, submitted propositions for adjustment of such questions between Costa Rica and Nicaragua, but they were rejected by Nicaragua. In 1853, Marcy, anxious to prevent European intermeddling in Central American affairs (and especially English encroachments in Honduras), encouraged the re-establishment of the Central Federation, but he was not ready to pledge the American government to expel the British from the Bay Islands. After 1853, American diplomatic relations in Central America were affected by the constant apprehension of European influence inimical to American interests, and by a series of irritating events including the bombardment and burning of Greytown by Americans in 1854 as a punishment for an alleged insult to the American Minister to Nicaragua.

Relations were complicated by Walker's bold designs in connection with the political factions in Nicaragua, culminating in his conquest of Nicaragua and his election to the presidency of the country. By his expeditions, and by the filibuster diplomacy with which he vainly sought to gain recognition at Washington, he caused Nicaragua to present to the American government a series of claims for damages and created an ill feeling of all the Latin American representatives which culminated in the draft of the proposed treaty of alliance against the supposed designs of the United States.

The most important result of the Walker episode was the closure of the transit, causing a diversion of traffic which perhaps changed the destiny of Nicaragua.

In this period, by 1856, the American government adopted a more aggressive American policy in regard to control of transit and canal routes.

During the Civil War, the Central American people, seeing that the causes which produced filibustering were passing away by the results of Union victories, and fearing the designs of all Europe (and especially of France) against American states, became more friendly to the government at Washington and anxiously hoped for the restoration of the Union. Soon after the fall of Vicksburg and the failure of Lee at Gettysburg, some advocated annexation to the United States. Others relying on the American government as natural protector of American republics requested alliance or aid. To them Seward replied that the most effective aid to American republics was the moral influence resulting from the integrity of the American Union and the stability of republican institutions.

The considerate policy of Secretary Seward during the Civil War period in forbearing to press claims of American citizens against the

government of Nicaragua — claims which had long been a source of diplomatic irritation — unfortunately caused Nicaragua to regard the claims as abandoned and to refuse to negotiate a claims convention in 1871, although she agreed to a treaty of amity, commerce and navigation in 1867. The claims long remained a source of diplomatic discussion at intervals and were never settled.

Until the beginning of the 20th century the chief interest and attention of the United States in Central America, aside from the maintenance of the Monroe Doctrine, was centred in the possibility of constructing a trans-isthmian canal across Nicaragua. With the idea that the Nicaraguan route was more practical than the Panama route, an American canal company was organized in 1889 — nominally to build a canal across Nicaragua, but really to induce the American government to take the responsibility in the enterprise. Until 1903, a violent controversy ensued between the advocates of the two routes. With the idea of constructing a canal via the Nicaragua route the American government negotiated for the withdrawal of the Clayton-Bulwer Treaty which was finally terminated by the Hay-Pauncefote Treaty of December 1901. Soon thereafter, however, a decision was made in favor of the Panama route, disappointing the hopes of Nicaragua.

In recent years, earlier American interests and influence in Central America have been modified and expanded by new American expansions in world commerce and larger American participation in world politics. By 1917 the United States dominated the Central American market and invested in Central America more capital than any other country, and was thus more closely related to the country by economic bonds.

The American government, with a policy of forbearance and national unselfishness, too long allowed Central America to suffer from divisions, irresponsible leadership, revolution and bankruptcy. True, it sometimes used its good offices to prevent interstate conflicts, illustrated in 1888 by President Cleveland's arbitration of a long pending boundary dispute between Costa Rica and Nicaragua. With the hope of reducing sources of conflict it also urged a closer union and co-operation, recommending a return to the earlier policy of federation. In 1874 it began a series of friendly efforts to encourage the establishment of a strong and settled union, but practically abandoned its diplomatic efforts in that direction after the *pourparlers* of Blaine in 1881.

In 1896, the last attempt to restore the early Federal union was made by the Presidents of Honduras, Nicaragua and Salvador, who (in accord with a treaty of 1895) formed, for the exercise of their external sovereignty, a single loose political organization with the title "Greater Republic of Central America" which was promptly recognized by the American government by the reception of a minister, but with the distinct understanding that the responsibilty of each of the separate republics toward the United States remained wholly unaffected. Again the hope of the formation of a permanent federation was disappointed. In 1898, as a result of revolutionary movements — and especially a separatist movement in Salvador — the provisional executive council of the Greater Republic announced the dissolution of the union by mutual consent.

In 1906 President Roosevelt with the co-operation of President Diaz, in order to terminate a war acted as mediator in a dispute of Guatemala with Salvador and Honduras. This was in accord with the treaty of peace which received the assent of all the five republics except that of President Zelaya of Nicaragua, and directly recognized the obligation of the United States to mediate and intervene in Central American affairs. In February 1907 the American government failed in a friendly mediation to prevent Zelaya from making war against Honduras, but was able to prevent the spread of the conflict to Salvador and Guatemala. In August 1907, by strenuous diplomatic representations, it averted war between Nicaragua and Salvador.

At Washington, in 1907, through negotiations encouraged and stimulated by the United States on the initiative of President Roosevelt, the diplomatic representatives of the five separate republics held a Central American Peace Conference to find a basis of agreement on political, commercial and financial relations. The chief results were a series of palliative measures: the establishment of a Central American International Bureau as a bureau of information (a miniature of the Pan-American Union); the foundation of a Central American Court of Justice (five members) in Costa Rica, for the arbitration of questions of an international character affecting the relations of the five republics; and a provision for later Central American annual conferences to discuss political and economic questions of community interest.

The American government, after the derision which greeted the first decision of the new Central American court, concluded that a court without means of enforcing its decisions was of no value — and reluctantly, but logically, concluded that American intervention was necessary to prevent depredations by the Zelaya government in Central America. In 1909, after the execution of two Americans in Nicaragua, it intervened directly, compelled Zelaya to flee and entered into a treaty agreement (negotiated by Secretary Knox) to act as a receiver for Nicaragua and to aid the new government in the rehabilitation of its finances. In the summer of 1912 it landed troops at the request of the Nicaraguan government to protect American lives and property and preserve free communication with the legation, and operated the national railway under the protection of American soldiers. It also negotiated a treaty, later approved by the Wilson administration, securing for its services in rehabilitating the finances sole rights to the construction of a canal across Nicaragua and to a coaling station in the Gulf of Fonseca. In August 1914 the Nicaraguan government was kept in power only by the presence of American troops landed at Bluefield.

The treaty, finally ratified by the American Senate in February 1916, providing substantial aid for the support of legally constituted good government in Nicaragua, was opposed by Costa Rica, who complained that it violated her rights. It was also opposed elsewhere in Central America on the ground that it would prove an obstacle to Central American union. The governments of Salvador and Honduras joined in

the protest. Costa Rica brought suit against Nicaragua in the Central American Court of Justice at Cartago (Costa Rica). The court (in 1916) decided that Nicaragua acted illegally in selling canal rights without consulting Costa Rica, and in threatening the neutrality of Honduras by permitting a United States naval base to be established on the Gulf of Fonseca; but Nicaragua refused to be bound by the decision.

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JAMES M. CALLAHAN,
Professor of History and Political Science, West Virginia University.

CENTRAL BANKS OF ISSUE. See BANKS AND BANKING—WORLD'S SYSTEMS (Article 3).

CENTRAL CITY, Colo., city and county-seat of Gilpin County, situated on the Union Pacific Railway, 40 miles northwest of Denver and 20 miles southwest of Boulder. It lies in a gold-mining district of the Rocky Mountains and its industries are chiefly connected with the development of the mines, which have been worked for about half a century. The first discovery of gold in paying quantities in the State was made here. Central City was settled in 1859 and was incorporated in 1864. The government is administered by a mayor, elected biennially, and a city council. There are municipal waterworks. Pop. 1,782.

CENTRAL CITY, Ky., city in Muhlenberg County, on the Illinois Central, the Louisville and Nashville and the Kentucky and Midland railroads, 35 miles northwest of Bowling Green. It is the centre of the bituminous coal region of western Kentucky and its coal-mining interests are extensive. It has a public library and railroad repair shops. Pop. 2,545.

CENTRAL CITY, Neb., city and county-seat of Merrick County, 130 miles west of Omaha, on the Platte River, the Chicago, Burlington and Quincy and the Union Pacific railroads. It is the seat of Nebraska Central College and has extensive agricultural and stock-raising interests. The electric plant and waterworks are the property of the municipality. Pop. 2,428.

CENTRAL COLLEGE, a coeducational institution in Fayette, Mo., organized in 1857 under the auspices of the Methodist Episcopal Church South; reported at the end of 1916: Professors and instructors, 13; students, 252; volumes in the library, 11,460; value of all property, $570,000.

CENTRAL FALLS, R. I., town in Providence County, situated on the Blackstone River and the New York, New Haven and Hartford Railroad, four and one-half miles north of Providence. It has a number of large manufacturing establishments, with an aggregate capital of $3,389,000, including cotton, woolen, silk, haircloth, glass, machinery and leather factories. The river supplies excellent power. There are several churches, newspapers and both national and savings banks. It obtains its water supply from Pawtucket, though it owns the pipe system by which the water is supplied. The town, formerly included in that of Lincoln, was incorporated in 1895. Under its present charter, the mayor and city council are elected biennially, the latter being a bicameral assembly. The executive, with the consent of the aldermen, nominates police officers, and the school committee is chosen by popular election; all other officers are chosen by the council. Pop. 22,754.

CENTRAL FORCES. See MECHANICS.

CENTRAL OF GEORGIA RAILWAY COMPANY, a corporation which owns or operates in Georgia 1,340.47 miles, in Alabama 579.55 and in Tennessee 4.07, a total of 1,924.09 miles of main track. The northern terminus is Chattanooga; the western Birmingham and Montgomery; the southern Lockhart, Ala.; and the eastern Savannah. The following lines constitute the system:

Owned — Under first, consolidated and general and refunding mortgages: Savannah to Atlanta, Ga.; Gordon to Milledgeville, Ga.: 311.34 miles.

Owned — Under divisional, consolidated and general and refunding mortgages: Dover to Brewton, Ga.; Milledgeville to Covington, Ga.; Macon Junction to Athens, Ga.; Columbus, Ga., to Andalusia, Ala.; Carrollton, Ga., to Belt Junction, Chattanooga, Tenn.; Chickamauga to Durham, Ga.; Lyerly, Ga., to Dewey, Ala.; Greenville to Raymond, Ga.; 1.67 Mile Post to Margaret, Ala.: 579.22 miles.

Owned — Under consolidated and general and refunding mortgages: Savannah to Tybee, Ga.; Barnesville to Thomaston, Ga.; Griffin to Carrollton, Ga.; Meldrim to Lyons, Ga., 58.09 miles, leased to Georgia and Alabama Railway Company; Covington to Porterdale, Ga.; Americus to Columbus, Ga.; Columbus to Greenville, Ga.; Columbus, Ga., to Birmingham, Ala.; Opelika to Roanoke, Ala.; Montgomery to Eufaula, Ala.; Eufaula to Ozark, Ala.; Henry Ellen to 1.67 Mile Post, Upper Cahaba branch: 541.83 miles. Grand total owned, 1,432.39 miles.

Leased — Augusta and Savanah Railroad, Southwestern Railroad, Chattahoochee and Gulf Railroad: 477.52 miles.

Trackage rights, 14.18 miles. Total miles operated, 1,924.09.

Funded Debt.— The funded debt of the company on 30 June 1915 was $37,032,350.

Earnings.— The general income account for the year ended 30 June 1915 was as follows:

Total operating revenues	$12,108,184
Total operating expenses	8,973,511
Net operating revenues	$3,134,673
Taxes	$576,544
Uncollectible revenues	10,496
Operating income	$2,547,633
Other income	1,355,998
Total income	$3,903,631
Total charges	2,701,626
Surplus after charges	$1,202,005
Dividends	1,150,000
Balance	$52,005

Equipment and Traffic.—Central of Georgia Railway Company owns 336 locomotives, 273 passenger cars, 10,220 freight cars and 389 service cars, and requires the services of more than 10,000 employees. The company transports annually about 4,500,000 passengers and 5,000,000 tons of freight.

History.—The company was incorporated under its present name with a capital of $5,000,000, 17 Oct. 1895. Through the purchase of its entire outstanding capital stock the Illinois Central Railroad Company acquired control in June 1909. On 17 June 1912 the charter of the Central of Georgia Railway Company was amended so as to permit the issue of $15,000,000 (preferred) additional stock. The railroad was originally incorporated 20 Dec. 1833, as The Central Railroad and Canal Company of Georgia, with capital of $1,500,000. In 1835 the corporate name was changed to The Central Railroad and Banking Company of Georgia. The first train passed over the whole line from Savannah to Macon (190 miles) on 13 Oct. 1843; the Macon depot was opened for regular business on 1 Nov. 1843 and trains were regularly operated over the whole line daily thereafter, Sundays excepted. Earnings from carrying passengers and freights are reported as early as August, September and October 1839. The road at that time was completed to a point about 76 miles from Savannah toward Macon. The road from Savannah to Macon is reported to have cost, including depots, motive power and rolling stock, $2,581,723, an average of $13,588 per mile. The lines listed above and completing the system were built afterward and incorporated by purchase or lease. The Central Railroad and Banking Company of Georgia was leased to Georgia Pacific Railway Company 1 June 1891, and passed into receivers' hands on 4 March 1892. Deed of special master to Samuel Thomas and Thomas F. Ryan is dated 17 Oct. 1895, and confirmatory deed from the receivers to Central of Georgia Railway Company is dated 11 Dec. 1896. As already stated above, the company has since come under the control of the Illinois Central Railroad Company.

CENTRAL INDIA STATES, the official British term for a collection of states in Hindustan, consisting of five groups or agencies, namely, Bundelkhand, Bhaghelkhand, Gwalior, Rewa and Malwa, covering an area of 121,845 square miles, under the ultimate charge of the governor-general's agent at Indore. The largest individual states are Gwalior, Indore, Bhopal and Rewa; total pop. 15,699,800.

CENTRAL PARK, the most noted park in New York city, extends from 59th street to 110th street between Fifth avenue and Eighth avenue. In 1856, the year of its purchase by the city, the land now constituting Central Park was occupied by shanties, bone-boiling establishments, piggeries and pools of offensive stagnant water, which rendered the neighborhood anything but park-like. The first full year's report of the men who were given the work of turning this ground into a park contains the following description of its condition:

"It was already a straggling suburb, when purchased by the city, and a suburb more filthy, squalid and disgusting can hardly be imagined. A considerable number of its inhabitants were engaged in occupations which are nuisances in the eyes of the law and forbidden to be carried on so near the city. They were accordingly followed at night in wretched hovels half hidden among the rocks. During the autumn of 1857, 300 dwellings were removed or demolished by the commissioners, together with several factories and numerous 'swill milk and hog-feeding establishments.' Ten thousand loads of stone were also taken off the land and used to build a rough enclosing wall."

This description helps one to appreciate the vast amount of work and artistic planning which has been necessary to bring the park to its present state of beauty and attractiveness, and it is interesting to see how fully the prophecy of a park commissioner, who wrote in 1868, has been fulfilled:

"But we who are in the middle of life," he says, "can never know all its beauty. That is reserved for those for whom we have planted these shrubs and trees, and spread these level lawns. These trees will arch over many happy generations, and thousands who are not yet born will enjoy the sweet green of the grass; and it will ever habitually serve to keep the memory of its founders green."

The central site was finally selected despite its uncompromising topography in preference to the one first proposed at 66th street on the East River — the Jones' Wood site — because it was central and spacious. It was also thought that the great expense of turning it into building lots — the extensive filling of low, swampy ground and blasting away of ledges — would enable the city to purchase the land at a low figure. Including a number of acres of water surface, comprising the two reservoirs belonging to the water department, the cost was about $7,500 an acre. The total acreage, including the subsequent extension to 110th street, was 843, and the price paid $6,348,959.90.

The special committee appointed by the board of aldermen to select the most desirable park site pronounced emphatically in favor of "the Central Park," stating their opinion that "it could be made to compare favorably with the most celebrated public grounds of the chief cities of Europe, not excepting Hyde Park of London, the Champs Elysées of Paris, the Prater of Vienna, the Cascine of Florence, the Corso of Rome, the Prado of Madrid, or even on the American continent, with the spacious plazas of Havana or the lovely botanical gardens of Rio de Janeiro."

It was freely predicted by the opponents of the park that it would prove a white elephant on the hands of the city; that it could never be made into a decent-looking park and was an unnecessary extravagance which the city did not need and could not afford.

The largest settlement of the park seems to have been along the Eighth avenue side. Mount Saint Vincent was included within the park borders, situated just west of Fifth avenue at 105th street, on the old Boston post road, which ran diagonally through the park. The land and buildings forming the State arsenal were subsequently purchased by the city and added to the park in 1867, the price paid being $275,000.

Owing to the lack of funds no work was done in improving the land until 1857. In

April of this year the legislature authorized the issuance of bonds and in the following June a tentative beginning was made on the park. Preliminary surveys had been carried out by Egbert L. Viele, the first engineer to the commissioners, but they soon decided that it would be desirable to offer a series of prizes to outside architects for designs for the formal laying out of the land. In 1857 such an announcement was made and on 1 April 1858 30 designs were submitted. That of Messrs. Olmsted & Vaux was chosen and they were awarded the first premium of $2,000. In 1857 Mr. Olmsted had been appointed superintendent to the board; George E. Waring, agricultural engineer; Samuel I. Gustin, nurseryman, and several other landscape offices had been created and filled. In 1858 Mr. Olmsted was promoted to architect-in-chief at a salary of $2,500 a year and the other offices abolished or subordinated to his. The work of putting the successful design into execution was begun by Mr. Olmsted, Calvert Vaux and J. W. Mould in June 1858. The original plan has been pretty closely adhered to, during the 60 odd years of the park's existence, although there have been times when strong efforts were made to alter it, and even to remodel some of the previous work. In 1871, when the Central Park commissioners were legislated out of office and a board of public parks for the whole city instituted, such an attempt was made, one of its features being an extensive thinning of the trees.

Until 1871 the history of the park was an uneventful one. Most of the commissioners had served on the board since its first year, and, except for family squabbles over the details of management and construction, the improvements were carried on without interruption practically in the entire charge of Mr. Olmsted. The difficulties which began to interfere with the efficiency of the department after its political organization in 1871 are indicated by the following extract from a pamphlet by Mr. Olmsted, who was subsequently made a commissioner and president of the board, shortly prior to his dismissal:

"As superintendent of the park," he says, "I once received in six days more than 7,000 letters of advice as to appointments, nearly all from men in office." Delegations from various political organizations came to find out "what share of his patronage they could expect," and in order to make him as little trouble as possible in its parceling out "they took the liberty to suggest that there could be no more convenient way than that you should send us our due quota of tickets, if you please, sir, in this form, leaving us to fill in the name." Here a pack of printed tickets was produced, which proved to be blank appointments, bearing the signature of Mr. Tweed. "That," continued the spokesman of the delegation, "was the way we arranged it last year, and we don't think there can be anything better."

There seems to have been some misconception, during the early years of the park, as to its real purpose, and considerable jealousy of its regulations. In April 1864, for instance, one of the regiments of the first division of the National Guard, despite the vehement opposition of the park keepers, marched through one of the gates and proceeded to drill upon the green. Another regiment subsequently attempted to do the same thing.

An interesting item in the report for 1863 is the announcement that 14 European sparrows, "*moineaux* of France," were let loose in the park in the spring of that year. This original 14, apparently the pilgrim fathers of the present local settlement, must now be represented by several million.

The paving of Fifth avenue up to the park was completed in 1863. Previous to this, especially in wet weather, the approaches had been extremely bad, and the completion of the Fifth avenue paving led to an immediate increase in the use of the park for driving. In its early days guards were stationed at each of the park gates, and a part of their duty was to count the number of persons passing in. In 1861 the result of the count was 1,863,263 pedestrians, 73,547 equestrians and 456,849 carriages, the total number of visitors being estimated at 2,404,659.

"For the purpose of ascertaining the nature of the existing vegetation," says the first annual report (1857–58), "a botanical survey of the park has been made. First, to learn how far it can be made available in the projected improvements and to ascertain what plants will prove most flourishing if transplanted to this ground, and second to discover what alterations the soil will require in order to admit of an increased variety."

This report details about 70 species of trees, shrubs and vines. Among the trees were included maples, beech, dogwood, chestnut, catalpa, red birch, persimmon, ash, locust, black walnut, red cedar, sweet gum, sycamore, poplar, American aspen, oak and elm. All told there were about 150,000 trees and shrubs. Regarding the present vegetation there seems to be no available data, no continuous record of the planting having been kept nor any detailed botanical study of it made during recent years. The soil of the park was never good in quality, nor abundant enough to support the vegetation of a park. For this reason the public had to be excluded from the meadows and lawns, as a single day's trampling of the grass nearly destroyed it. In 1903 a systematic renovation of the soil was undertaken and continued until nearly the whole planted area was covered with loam, carted from Long Island, at an expense of upward of $2,000,000.

Over $30,000,000 have been spent in bringing the park to its present condition. It is 2½ miles long, half a mile wide and covers 843 acres, of which 185 are in lakes and reservoirs and 408 in forest containing over half a million trees and shrubs. There are 31 miles of walks, 10¼ miles of roads and 5½ miles of bridle paths. Twenty gates bearing fanciful titles such as Artists, Scholars, Hunters, Strangers, Students, etc., give admittance to the park. Adding greatly to its attractions are zoological and botanical gardens, conservatories, fountains, free tennis courts, a field for baseball and other games, the tree-lined mall with its fine statues of world-wide celebrities and numerous other monuments, notably the Egyptian obelisk and the Maine monument, gracing different points.

CENTRAL PROVINCES AND BERÅR, India, a chief commissionership created in 1861,

embracing the former province of Nagpur, the two territories of Sagar and Nerbudda and other territories added since, the present designation dating from 1903. It is bounded by the Central Indian Agency and Chota-Nagpur on the north, Orissa on the east, Madras on the southeast and Hyderabad and Bombay on the southwest and west. Its total area is 99,823 square miles, of which the portion under direct British administration contains 82,057 square miles. The surface is covered with numerous hilly ranges, among which the chief, the Satpura Range, enters from the west, runs in an easterly direction and has numerous offshoots. It is traversed by the Nerbudda, Wardha, Wainganga and Mahanadi rivers, all of which are navigable for some distance except during the dry season. The climate is hot and dry and there is a good average rainfall, but the soil absorbs the moisture so quickly that irrigation becomes necessary in cultivation. Of the total area only about one-fourth is cultivated, while the remainder is either unfit for cultivation or is covered with jungle and forest. The cultivated portion consists of rice fields, wheat and other foods, grains, oilseeds and cotton. Coal and iron are found; the manufacturing industries are but little developed and consist of iron articles and cotton goods. The Indian Midland, Bengal and Great Indian Peninsula railways traverse the Central Provinces. The administration is vested in a chief commissioner, assisted by a secretary and a number of commissioners in charge of special departments. The British possessions are divided into four divisions of Nagpur, Jabalpur, Narbada and Chutteesgurh, each in charge of a commissioner. The tributary states are 15 in number. In 1902 the government of India took Berár on lease in perpetuity at a rental of $850,000 annually to the Nizam of Hyderabad, incorporated the Hyderabad contingent in the Indian army, and in the next year annexed Berár to the Central Provinces under a resident commissioner. Education is aided partly by the government and is partly private. The population of the British divisions in 1911 was 10,859,146, and the tributary native states had 3,057,162. Nearly 82 per cent is Hindu, 16 per cent Animistic and the remainder consists of Christians and Mohammedans. The chief town and seat of the chief commissioner is Nagpur.

CENTRAL RAILROAD OF NEW JERSEY, The, a system operated in New Jersey, New York and Pennsylvania by the Central Railroad Company of New Jersey and controlled by the Reading Company which owns over 52.9 per cent of the capital stock. The company was formed 22 Feb. 1849 for the consolidation of the Elizabeth and Somerville Railroad Company and the Somerville and Eastern Railroad Company, and has since absorbed the Newark and New York Railroad Company, the Perth Amboy and Elizabeth Railroad Company, the Constable Hook Railroad Company, the Manufacturers Railroad Company, the South Branch Railroad Company, the High Bridge Railroad Company, the Longwood Valley Railroad Company and the Lake Hopatcong Railroad Company. In 1915 the company owned, leased and controlled 680.65 miles of railroad. The lines owned amounted to 156.63 miles; proprietary lines, which had been practically absorbed, to 227.23 miles; leased lines to 211.24 miles; a jointly leased line to 42.41 miles, and trackage rights 43.14 miles. The lines owned had 156.63 miles of first track, 96.16 miles of second track, 30.36 miles of third track, the same amount of fourth track, 418.93 miles of side track, total 732.47 miles of track, of which 730.98 miles were steel rails of 70 to 135 lbs. per yard, and 2.49 miles iron rails of 50 to 70 lbs., the gauge being 4 feet 8½ inches. The proprietary roads had 227.23 miles of first track, 12.14 miles of second track, 94.97 miles of side track, total 334.34 miles of track, of whch 327.30 miles were steel rails and 7.04 miles iron. The leased roads since the merger of 4 March 1905 have 211.24 miles of first track, 102.88 miles of second track, 10.65 miles of third track, 228.19 of side track, total 552.96 miles of track, of which 550.42 miles are steel and 2.54 miles iron rails. The jointly leased road had 42.41 miles of first track, 40.73 miles of second track, 43.21 miles of side track, total 126.35 miles of track, of which 126.35 miles were steel rails. The roads with trackage rights had 43.14 miles of first track, 9.66 miles of second track, 30 miles side track, total 53.10 miles of track, all of steel rails. Grand total, 1,799.22 miles of track operated, of which 11.07 miles were of iron rails and the rest steel. The rolling stock consisted of 523 locomotives, 517 passenger coaches, 108 combination cars, 95 baggage, mail, dining and express cars, 23,917 freight cars of all kinds and 649 service cars. The marine equipment consisted of 3 steamboats, 10 ferryboats, 11 tugboats, 31 car floats and 93 lighters and barges.

The lines owned were: Jersey City to Phillipsburg, N. J., 72.30 miles; Communipaw to Newark, N. J., 6.22 miles; Brills to Passaic River, N. J., 1.68 miles; East 22d street, Bayonne, to Constable's Hook, N. J., 1.95 miles; Elizabethport to Perth Amboy, N. J., 12.13 miles; Elizabethport to Brills, N. J., 5.51 miles; Elizabeth to Elizabeth Docks, N. J., 2.72 miles; Somerville to Flemington, N. J., 15.78 miles; High Bridge to Wharton, N. J., 25.17 miles; German Valley to Chester, N. J., 4.51 miles; Hopatcong Junction to Nolan's Point, N. J., 5.56 miles; besides two spurs to factories; total 156.63 miles. The principal proprietary roads were: Cumberland and Maurice River Railroad, with an extension, 22.43 miles; Frechold and Atlantic Highlands Railroad, 22.75 miles; Navesink Railroad, 4.66 miles; New Jersey Southern Railroad, 73.62 miles; Sound Shore Railroad, 6.17 miles; Toms River Railroad, 7.57 miles; Toms River and Barnegat Railroad, 14.71 miles; Vineland Railroad, 46.82 miles; total with various smaller branches, 227.23 miles. The leased lines include: the Lehigh and Susquehanna Railroad, 105.32 miles; the Nesquehoning Valley Railroad, 16.69 miles; Ogden Mine Railroad, 9.86 miles; Tresckow Railroad, 7.59 miles; Dover and Rockaway Railroad, 5.12 miles; Wilkes-Barre and Scranton Railroad, 4.27 miles; Hibernia Mine Railroad, 4.20 miles. It leases jointly with the Pennsylvania Railroad Company the New York and Long Branch Railroad, 38.04 miles, and with the Philadelphia and Reading Railroad the Allentown Terminal Railroad, 3.27 miles, and has trackage rights on the Union Coal Railroad — Union Junction to Minooka Junction, Pa., 9.66 miles; and on the Philadelphia and Reading Railroad — Tamanend to Silver Brook, Pa., 5.40 miles;

Greenwood Junction to Tamaqua, 1.04 miles; Greenwood Junction to Koska William, 9.47 miles. The rentals of the leased lines in 1915 were: Allentown Terminal Railroad, $13,500; Dover and Rockaway Railroad, $11,600; Hibernia Mine Railroad, $6,500; Lehigh and Susquehanna Railroad, $2,210,229.99; Ogden Mine Railroad, $23,000; Wilkes Barre and Scranton Railroad, $66,606.48; miscellaneous, $284,253.93; total of rentals, $2,615,690.40. The gross earnings for the fiscal year ended 30 June 1915 amounted to $28,742,255.78; the operating expenses to $18,951,306.70, leaving a balance of net earnings, $9,790,949.08, with $2,170,614.97 non-operating income; this made a total of $11,961,564.05. In 1915 the operating revenue decreased $508,836.50 or 1.74 per cent. The average revenue tonnage per train per mile was 565.7, an increase of 11.0 tons, while the average distance each ton was carried was 71.51 miles, a decrease of 1.29. The total payments, interest on funded debt and guarantees, miscellaneous interest, rentals of leased lines and taxes amounted to $6,649,386.47, leaving a surplus of $5,312,177.58, of which $3,292,416 was paid in dividends to stockholders and $2,019,761.58 transferred to credit of profit and loss.

The revenue from transportation sources in 1915 was as follows: Merchandise traffic, $12,649,148.92, an increase of $429,046.16 over 1914; anthracite traffic, $8,712,472.26, a decrease of $661,448.05; passenger traffic, $5,487,220.85, a decrease of $369,168.84; express and mail traffic, $480,306.02, a decrease of $47,846.24; and miscellaneous traffic, $1,413,107.93, an increase of $140,580.47.

Of the $30,000,000 authorized capital stock of the company there was outstanding in 1910 $27,436,800. The total funded indebtedness of the company at the close of the fiscal year ended 30 June 1915 amounted to $45,661,000 as against $46,271,000 at the end of the preceding year, a decrease of $610,000.

CENTRAL UNIVERSITY, popularly known as Central College, a coeducational institution at Pella, Iowa, organized in 1853, under the auspices of the Baptist Church and transferred in June 1916 to the Reformed Church in America. The university reported during the transition year of 1916: Professors and instructors, 17; students, 161; volumes in the library, 8,000; grounds, buildings and equipment valued at $110,000; budget for the year 1916–17, $18,000. An endowment of $200,000 has recently been raised, and it is confidently expected that the college will have a large increase of students under the new administration.

CENTRAL UNIVERSITY OF KENTUCKY, a men only institution at Danville, Ky., under the auspices of the Presbyterian Church. It was given its present organization in June 1901, by the consolidation of the Centre College of Danville (founded 1822) and the Central University of Richmond (founded 1874). Number of instructors reported, 50; number of students, 400; volumes in the library, 30,000; total value of property, $1,500,000.

CENTRAL VERMONT RAILWAY COMPANY. This company was chartered in 1898 under authority of Paragraph No. 6, Act No. 159 of the Laws of the State of Vermont, and was formed for the purpose of acquiring title to, owning and operating the railroads of the Central Vermont Railroad Company, in pursuance of a plan for the reorganization of that company issued 29 Sept. 1898. The property was sold under foreclosure 21 March 1899, and the Central Vermont Railway Company came into possession 1 May 1899.

Funded Debt.— The funded debt consists of first mortgage 4 per cent 20-year gold bonds due 1 May 1920, interest payable February, May, August and November. The amount authorized by the mortgage is $12,000,000, but there are only $11,750,000 issued — $250,000 being reserved in the hands of the trustee to be issued for betterments and improvements under proper restrictions. The bonds are secured on the entire property and assets of the company. Also Montreal and Province Line $200,000 first mortgage 4 per cent 50-year gold bonds, due 1 Oct. 1950, interest payable semi-annually in April and October. The mortgage is a first lien upon the Montreal and Province Line Railway, 40.6 miles in length, extending from Saint Lambert to Farnham, Quebec, 32 miles, and Marieville, Quebec, to Saint Cesaire, Quebec, 8.6 miles. The Central Vermont Railway Company owns the entire capital stock of the Montreal and Province Line Railway Company.

Car Trust Notes.— Under date of 1 Aug. 1906, $200,000 in notes were issued in favor of the Royal Trust Company, in part payment for four 10-wheel passenger locomotives and 10 Richmond compound freight locomotives. These notes, 200 in number, for $1,000 each, are payable in 10 consecutive annual instalments on the 1st day of August of each year. These notes bear interest at the rate of 4½ per cent per annum, payable quarterly on the 1st days of November, February, May and August of each year. Under date of 1 April 1907, $270,000 in notes were issued in favor of the National Trust Company, in part payment for 500 flat cars. These notes, 270 in number, for $1,000 each, are payable in 20 semi-annual instalments on the 1st days of April and October of each year. The amount so payable on the 1st day of April is $13,000 — and on the 1st day of October, $14,000. These notes bear interest at the rate of 4½ per cent per annum, payable semi-annually on the 1st days of April and October of each year. Under date of 25 Feb. 1912, $980,000 in notes were issued in favor of Messrs. Blair & Company, in part payment for two standard baggage and express cars, six standard first-class coaches, two standard first-class parlor cars, one standard first-class diner, 1,000 box cars, four Pacific type locomotives, three switching locomotives and 200 steel coal cars. These notes, 980 in number, for $1,000 each, are payable in 20 semi-annual instalments on the 1st days of February and August of each year. These notes bear interest at the rate of 5 per cent per annum, payable semi-annually on the 1st days of August and February of each year.

Mileage.— The company owns and operates the following lines: Between Windsor, Vt., and Saint Johns, Quebec, 177.5 miles; between Bethel, Vt., and Bethel Quarries, 5.4 miles; between Montpelier Junction and Williamstown, Vt., 14.9 miles; between Essex Junction and Burlington, Vt., 8 miles; between Essex Junction and Cambridge Junction, Vt., 26

miles; between Saint Albans and Richford, Vt., 28 miles; between Swanton Junction, Vt., and Rouses Point, N. Y., 17.7 miles; between S. S. and C. Junction, Quebec, and Waterloo, Quebec, 40.8 miles; between Saint Lambert, Quebec, and Frelighsburg, Quebec, 50 miles; and between Marieville, Quebec, and Saint Cesaire, Quebec, 8.6 miles; a total of 376.9 miles. The Central Vermont Railway Company leases the New London Northern Railroad, extending from New London, Conn., to Brattleboro, Vt., 121 miles; from Montville, Conn., to Palmertown, Conn., 2.5 miles; also the West River Railroad, extending from Brattleboro, Vt., to South Londonderry, Vt., 36 miles, a total of 159.5 miles, at an annual rental of $216,552.50, payable monthly.

Equipment.— On 30 June 1915 the rolling stock consisted of the following: Locomotives — passenger 29, freight 63 and switching 5, a total of 97; passenger cars — coaches 61, café-parlor 2, parlor 2, dining 1, combination passenger and baggage 12, baggage, mail and express 31 and milk 2, a total of 111; freight cars — box 2,108, refrigerator 15, stock 8, coal 215 and flat 655, a total of 3,001; work cars — cinder 18, wreck 21, snowplow 8, construction 84, caboose 45, scraper 14, official and pay 2, store 1, a total of 193; a grand total of 3,402. The road and equipment up to 30 June 1915 represented an outlay of $16,778,945.96.

Traffic, Earnings, etc.— For the year ending 30 June 1915 there were 3,651,234 tons of freight carried or 292,602,872 tons carried one mile, showing a gross earning of $2,822,596.40 or $.0096 per ton per mile. For the same period the number of passengers carried was 1,559,533 or 42,136,108 carried one mile, showing gross earnings of $1,231,263.65, an average of $.0250 per passenger per mile. The passenger receipts include the mail and express receipts for the year. The total railway operating revenue amounted to $4,210,411.07 and the railway operating expenses to $3,300,268.05.

CENTRAL WESLEYAN COLLEGE, a coeducational institution in Warrenton, Mo., organized in 1864, under the auspices of the Methodist Episcopal Church; reported at the end of 1916: Professors and instructors, 25; students, 359; volumes in the library, 10,000; grounds and buildings valued at $173,000; productive funds, $248,213.27; income, $25,000.

CENTRALIA, Ill., city in Marion County, on the Illinois Central, Southern, Chicago, B. & Q. and the Illinois Southern railroads, 60 miles east of Saint Louis and 252 miles southwest of Chicago. It is situated in the famous fruit-belt of southern Illinois and carries on an extensive fruit trade. The Illinois Central machine shops, employing 800 men, are located here, there are two coal mines, employing 700 men, an envelope factory with 200 employees, shoe-heel factory with 150 employees, and the city carries on many minor industries, such as the manufacture of flour, butter, ice cream, fruit-boxes, knit goods, iron and steel, etc. The United States census of manufactures of 1914 recorded 30 industrial establishments of factory grade, employing 309 persons, of whom 237 were wage earners, receiving annually $123,000 in wages. The capital invested aggregated $661,000, and the year's production was valued at $768,000: of this, $323,000 was the value added by manufacture. There are three banks capitalized at $230,000. Religious services are held in 10 church edifices and for educational purposes there are an excellent high school and graded public schools, supplemented by a Carnegie library. Centralia was first settled in 1853 and became a city in 1854, the affairs of the community now being administered by a mayor and council of 10 members elected every two years. The city owns the waterworks. Pop. (1910) 9,680; (1914) 11,000.

CENTRALIA, Wash., city in Lewis County, on the Northern Pacific Railroad, midway between Seattle and Portland. The chief resources of the city are derived from the lumber industry from coal and fire clay deposits, from farm and dairy products and canned goods. The city owns its electric lighting plant, its waterworks, has a Carnegie library, two banks, schools and many handsome church edifices. Centralia was first settled in 1857 by James Cochran, became a borough in 1873, a city in 1890 and has adopted the commission form of government. Pop. (1890) 2,026; (1900) 1,600; (1910) 7,300.

CENTRALISTS, one of the prominent political parties of Mexico, organized in 1823 and reorganized in 1837, and of which Santa Anna was long the leading spirit. The Centralists, or reactionaries, favored a single centralized form of government, whereas the Federalists, or States Rights party, favored autonomy of the states. To the keen rivalry of these political parties may be attributed the state of civil war and revolution which for so long a time was prevalent in Mexico. See MEXICO — HISTORY.

CENTRALIZATION, the placing in the hands of a central government jurisdiction over matters which might be under the management of local authorities. The term is used to denote the increase of power of a central authority already established, or the closer union under a central power of a confederation of partially independent states. The adoption of the constitution of the United States was centralization in the latter sense. The question of centralization in the first sense has been an important one in United States history, forming the point of dispute between the first two political parties, and being a frequent subject of discussion at all times. The question as applied to the United States is whether to interpret the constitution liberally, and give the national government power in doubtful cases; or whether to put a close construction on the constitution and give the States the benefit of the doubt.

CENTRARCHIDÆ, sĕn-trär'kĭ-dē, a family of fresh-water percoid fishes, confined to North America. The body is generally short, deep and compressed, with an equal curvature above and below, and covered with rather large, strong ctenoid scales. The mouth is terminal, variable in size, with the premaxillary protractile, and numerous fine, close teeth on all of its bounding bones. Both dorsal and anal fins are long, with 6 to 13 strong, sharp spines in the anterior part of the former, and 3 to 8 in the latter. All are active, pugnacious, carnivorous fishes, many of which build nests. They are important game and food fishes of small or moderate size, of which about 12 genera and

30 species are known, almost all of which are confined to the Mississippi Valley and the eastern United States, where they are almost the most characteristic fishes. The most important are the grass bass, black bass, rock bass, warmouth and sunfish (qq.v.).

CENTRE-BOARD, a contrivance used in a yacht or shallow, keelless or flat-bottomed vessel, to counteract the tendency to make leeway and to enable the craft to stand up under press of sail. It consists generally of a quadrangular wooden or iron plate which is bolted or hinged by its lower forward corner into a trunk or casing which fits, water-tight, over a fore-and-aft slot in the vessel's bottom, about midway of her length. When running before the wind or in shallow waters the centre-board is hauled up inside the trunk. When on a wind, or with the wind abeam, the centre-board is lowered, presenting a broad surface to the water on the same principle as a leeboard. The term centre-board is essentially American; elsewhere the contrivance is known as a sliding-keel. See YACHTS AND YACHTING; SPEED.

CENTRE OF BUOYANCY. The centre of buoyancy of a floating body is that point within its boundaries corresponding to the centre of gravity of the volume of water or other fluid which is displaced. It is customary to regard buoyancy as a force acting upward and opposed to gravity. This is not in accordance with fact, for all the phenomena of floating in water, air or other fluids are due entirely to the attraction of gravity — which acts constantly downward. (See HYDROSTATICS). When a body floats in water it sinks into the water and toward the centre of the earth only to the extent where the earth's attraction for the body and its attraction for the volume of displaced water are equal at that level. And as the weight of a body is the measure of the earth's attraction for it we say a floating body displaces its own weight of water. A floating body will therefore sink into water only to a point where the water beneath it is attracted toward the earth's centre more forcibly than is the floating body. The same phenomena may be observed in the case of a balloon. The balloon filled with a gas that is lighter than air at the sea-level will rise to a position where the earth's attraction for the balloon and its attraction for the volume of air displaced by the balloon are exactly equal. The centre of buoyancy of the balloon is the centre of gravity of the body of air displaced by the balloon.

When the centre of gravity of a floating body is below its centre of buoyancy (equivalent to its point of support — see EQUILIBRIUM), the body will float in stable equilibrium. When the centre of gravity is above the centre of buoyancy the equilibrium is unstable, and the body is liable to roll over in the water into such a position that its centre of gravity is below its centre of buoyancy. The same observations hold good as to bodies floating in air. A body which will float in unstable equilibrium in water would probably be in unstable equilibrium in mercury, the volume of mercury displaced having a much higher centre of gravity than the displaced water, and therefore lifting the centre of gravity of the floating body far above its centre of buoyancy.

CENTRE OF GRAVITY, or CENTRE OF INERTIA, a point in a body, or in a system of bodies, which in modern works on mechanics is usually and preferably called the "centre of mass." It is that point such that the vector sum (or integral) of the moments of the particles of the body with respect to it is zero. That is, if suspended by the centre of mass or gravity the system will be in equilibrium in any position. See MASS; MECHANICS.

CENTRE OF INERTIA. See CENTRE OF GRAVITY.

CENTRE OF OSCILLATION, or CENTRE OF PERCUSSION, that point of a pendulum at which its entire mass may be considered as concentrated, for the purpose of determining its time of oscillation. The pendulum may be suspended by an axis parallel to its original axis and passing through the centre of oscillation without altering its period.

CENTRE OF POPULATION, the centre of gravity of the population of a country, each individual being assumed to have the same weight. The centre of population in the United States has moved in a westward direction during the last 110 years along the parallel of 39° lat., in 1910 reaching the city of Bloomington, Ind. The following table shows the movement of the centre of population by decades since 1790:

Years Census	North latitude	West longitude
1790	39° 16.5′	76° 11.2′
1800	39° 16.1′	76° 56.5′
1810	39° 11.5′	77° 37.2′
1820	39° 5.7′	78° 33.0′
1830	38° 57.9′	79° 16.9′
1840	39° 2.0′	80° 18.0′
1850	38° 59.0′	81° 19.0
1860	39° 0.4′	82° 48.8′
1870	39° 12.0′	83° 35.7′
1880	39° 4.1′	84° 39.7′
1890	39° 11.9′	85° 32.9′
1900	39° 9′ 36″	85° 48′ 54″
1910	40° 6′ 24″	84° 59′ 59″

CENTRE OF PRESSURE. See HYDROSTATIC PRESS.

CENTRING, or CENTERING, the framing of timber by which the arch of a bridge or other arched structure is supported during its erection.

CENTRIFUGAL FORCE, a phrase popularly used to express the tendency manifested by a body revolving about a centre to fly away.

CENTRIFUGAL MACHINES, machines used for various purposes, in which centrifugal force produced by rapid revolution is utilized. Such a machine may be used for drying clothes or other goods, the articles being placed inside a hollow cylinder made of wire-gauze or with numerous perforations in its circumference, which, being driven at a high speed, the moisture is caused to fly off by centrifugal action. Sugar is now often separated from the molasses by a centrifugal machine, the product being commonly known by the trade name of "centrifugal sugar." The cylinder in which the sugar is contained is placed within a larger cylinder in which the molasses is received. Liquids, such as beer, can also be clarified and cleared of foreign substances by means of centrifugal action, the extraneous matters being made to collect at the circumference of the

vessel through the high rate of speed at which it is driven, while the clear liquid can be drawn off by an outlet at the centre. Cream is now commonly separated from milk in large dairies by the same method. See BUTTER.

CENTRIPETAL FORCE, that force operating on a body moving in a curve which tends to draw the body to the centre of the curve. A moving body tends to move in a straight line. It may be deflected from its course into another straight line by some other impulse. If it is held continually to a curved path, it is under the influence of a centripetal force. A common illustration is the movement of the earth in its orbit. The inertia of the earth's motion tends to send it flying off into space in a straight line, tangent to the curve of its orbit. The attraction of the sun is the centripetal force which overcomes its inertia so far as to hold it steadily to the curve of its path around the sun. If the earth's forward motion were suddenly checked, the sun's centripetal attraction would draw it straight to the sun's centre. See DYNAMICS; ENERGY, CONSERVATION OF.

CENTROCLINAL FOLD. See FOLD.

CENTROSOME. The centrosome was long thought to be a permanent organ of all animal and plant cells. It is an extremely small body, usually less than 1/25000 of an inch in diameter, and is almost always surrounded by a system of radiating threads. It was first described by the zoologist Flemming in 1875, but was named and brought into prominence by another zoologist, Boveri, in 1888. Three years later a French botanist claimed to have found centrosomes in the lily. The general appearance and behavior of the centrosome in animal cells may be illustrated by the first division of an egg (Fig. 1).

An examination of the figure will indicate that the centrosome plays an essential rôle in the division of the nucleus, since it gives rise to the spindle which moves the chromosomes to their place in the new nuclei. On account of this function, it was claimed that the centrosome must necessarily be present in all cells. However, it proved impossible to demonstrate a centrosome in some resting cells, like muscle cells, and so it was concluded that, in some cases, the centrosome might not be a permanent organ, but, rather, that it must be formed anew at each successive cell division. In the early nineties this view was quite generally accepted. While a centrosome was described and figured in great detail in the lily and various botanists began to find centrosomes in various groups of plants, other botanists could not demonstrate it even in the lily. In 1896 a vigorous investigation by several botanists of different nationalities, but chiefly American, working under the direction of Strasburger at Bonn practically solved the centrosome problem in plants. A centrosome behaving as in animal cells was found in two of the algæ and two of the fungi (Figs. 2 and 3).

On the other hand, it was definitely established that in the Scouring Rush, Equisetum, no centrosomes are present during nuclear and cell division. It was also demonstrated that no centrosomes are present in the Gymnosperms and Angiosperms. In all these plants the spindle is formed in another way, no centro-

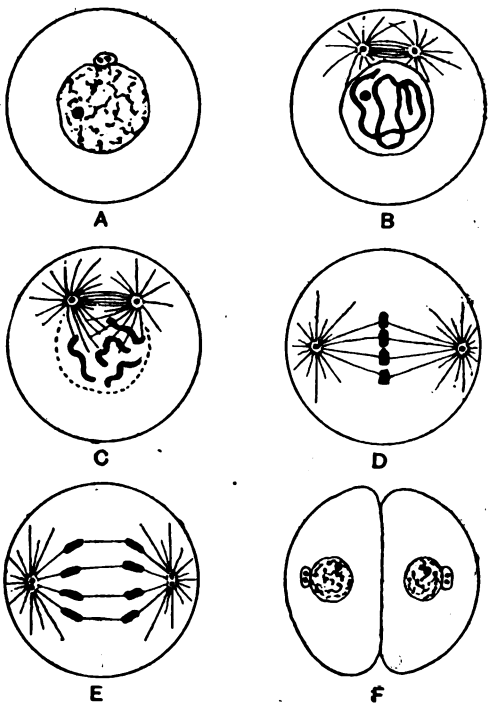

FIG. 1.— First division of an egg in which segmentation is complete. *A*, fertilized egg with nucleus and two centrosomes. *B*, the two centrosomes have moved apart, radiations have formed about them and a "spindle" has developed between them. *C*, the wall of the nucleus is breaking down and fibres of the spindle are becoming attached to the chromosomes. *D*, the spindle is fully formed and the chromosomes have been drawn by it into an equatorial position. *E*, the chromosomes have divided and are being drawn to the two poles of the cell by the spindle. Each centrosome has divided. *F*, the first two cells of the embryo have been formed, each with two centrosomes ready to repeat the process at the next division.

some being involved in the process. At the two divisions in spore mother cells a weft of fibres appears, closely surrounding the entire

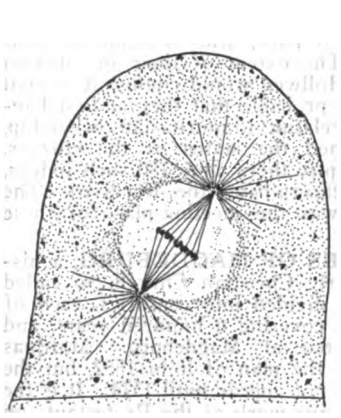

FIG. 2.

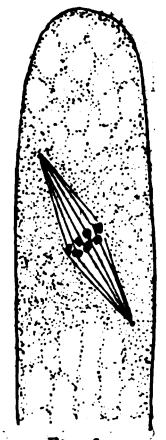

FIG. 3.

nucleus; the weft becomes drawn into many poles, which are gradually drawn together into

two opposite groups, so that the familiar bipolar spindle is established (Fig. 4).

In ordinary vegetative divisions, the spindle first appears as a pair of dome-shaped prominences, or caps, at opposite poles of the nucleus. No centrosome is concerned. Since that time many centrosomes have been demonstrated in various algæ and fungi; but in plants

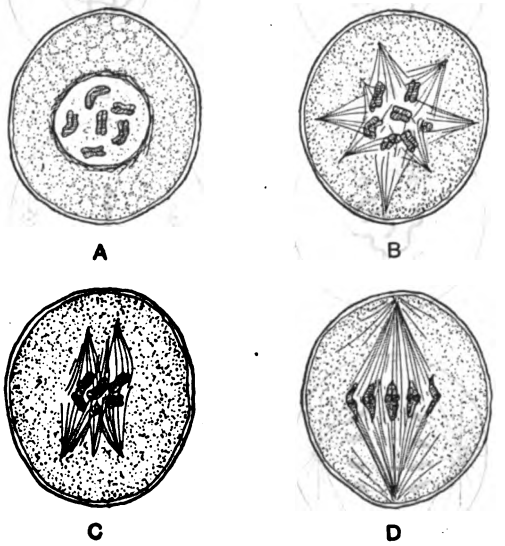

FIG. 4.— Development of a spindle, without centrosomes, in the pollen mother cells of the lily. *A*, the weft of fibres surrounding the nucleus. *B*, the formation of many poles, the "multipolar spindle." *C*, the numerous poles collecting into two groups. *D*, the completed bipolar spindle.

higher than these no centrosomes have been proved, except as the centrosome may appear as the blepharoplast (q.v.) during spermatogenesis. Consult Wilson, E. B., 'The Cell in Development and Inheritance'; also various articles in *Jahrbücher für wissenschaftliche Botanik* (1896 and 1897).

CHARLES J. CHAMBERLAIN,
Professor of Morphology and Cytology, University of Chicago.

CENTUMVIRI, judges of ancient Rome, three from each tribe, who determined ordinary causes. The extent of their jurisdiction is uncertain. Hollweg would confine it to civil cases; it seems probable that they at first handled questions relating to quiritarian ownership, which determined the status of the citizens. During the Empire there were 180 such judges, the presiding officers being the decemviri. The Basilica Julia was the meeting-place of these sessions.

CENTURIES OF MAGDEBURG, a history of the early Christian Church, so called because it was divided into centuries, each of the 13 volumes covering a hundred years, and was first written at Magdeburg. Matthias Flacius formed the plan of it in 1552, but the last volume did not appear until 1574. It is the first comprehensive work of the Protestants on Church history; its main purpose was to prove agreement of Lutheran doctrine with that of primitive Christians, and the difference between the latter and that of the Roman Catholics.

CENTURION, a Roman army officer who commanded a century, or body of 100 men. The rank of a centurion corresponded very nearly to that of a captain in modern armies. There were 60 centurions in each legion, a junior and a senior for each of the 30 maniples; the senior of the first maniple of the first cohort was the chief centurion, or primipilus, of the legion, and on him often devolved the actual charge of the entire group. See LEGION.

CENTURIPE, chĕn'too-rē'pā, Sicily, a town in the province of Catania, situated on a height above the valley of the Simeto, 28 miles northwest of Catania. It is situated in a district yielding soda, sulphur and marble. The ancient city (Centuripa), considerable ruins of which exist, was at one time among the important cities of Sicily. Emperor Frederick II destroyed Centuripe after removing the inhabitants to his new town of Agosta in 1233. It was rebuilt in 1548. Pop. 13,111.

CENTURY, in chronology, a period of 100 years. Modern chronology of Christian nations centres at the birth of Christ, and the centuries are numbered according to their order either before or after the event, for example, the 20th century A.D., the 4th century B.C.

In Roman times, (1) a division of 100 men in the army, corresponding to the modern company, 60 of which formed a legion; (2) a division of the six classes of the people, introduced by Servius Tullius, for the purposes of taxation and voting.

CENTURY-PLANT, a popular name of the *Agave americana,* or American aloe. See AGAVE.

CEORL, chĕrl. See CHURL.

CEOS, sē'ŏs, or **KEA,** kā'ä (sometimes called by the Italianized name of *Zea* or *Tsia*), an island in the group of the Cyclades, in the Ægean Sea, 13 miles off the coast of Attica. It is 13 miles long, 8 broad and 39 square miles in area. The central and culminating point is Mount Elias, 1,863 feet high. It is fairly fertile, raising fruit, wine, honey and valonia. In ancient times Ceos was noted as the birthplace of the poets Simonides and Bacchylides, and the physician Erasistratus, and the Cean laws were famous for their excellence. The capital is Ceos.

CEPHAELIS, sĕf-ą-ē'lĭs, a genus of plants belonging to the order *Rubiaceæ,* natives of tropical America. The roots of *C. ipecacuanha* furnish the commercial drug of that name. See IPECAC.

CEPHALASPIS, sĕf-ąl-ăs'pĭs, a genus of ostracoderms (q.v.) of the Devonian Period, characterized by a semi-circular or semi-oval head-shield, with spines at the angles. It has a curious superficial resemblance to the head-shields of certain trilobites.

CEPHALIZATION, the tendency exhibited in many different phyla of animals toward the specialization of the region about the mouth into a distinctive head, and the concentration there of nervous and sensory organs. In the chordates we find a clear development starting from the undifferentiated oral region of *Amphioxus* without any very special differentiation of its central nervous system and sense organs of the most generalized sort. The cyclostomes

and fishes form the next stage, in which there is a definite, though small, brain, and the more important of the special senses (those of smell, sight, hearing, equilibrium) are centralized in the head, which acquires a special skeleton, the skull. We finally come to the terrestrial vertebrates, in which all the special senses become located in the head, the lateral-line sense and dermal chemical sense being lost. The increasing size and complexity of the brain is one of the outstanding features of vertebrate evolution. In the arthropods we find a regular graduation from the equal segments of the chaetopod worms, which are probably not far removed from the primitive arthropod, to the well-defined head of the crayfish or insect, with its specialized eyes, antennæ, jaws and ganglia. The tendency toward cephalization is associated with the fact that the head is often the first part to take shape in the embryo; however, this fact, as exemplified by the trochosphere larva of the annelids, may indicate that the head of certain segmented forms is the true representative of the entire body of their ancestors, and that the formation of the segmented body may be the reminiscence of an ancestral multiplication by budding.

CEPHALOCELE. Hernia of the brain is either a congenital or an acquired (accident) condition. The former is rare, 1 case in 10,000; the latter, by reason of the World War, with its enormous number of gunshot wounds of the head, is very common. Following operation upon the skull, decompression for tumors, or for severe bony losses by gunshot wounds, the brain tends to protrude through the bony opening and forms a soft mass beneath the skin of the scalp. There may be no symptoms. When the defect lies in the motor regions epileptic convulsions are the most frequent effects noted.

CEPHALOCHORDA, a group of *Chordata* (q.v.) represented by the lancelet or Amphioxus (q.v.). Other names for the group are *Leptocardii* and *Acrania*. The *Cephalocorda* are fish-like in shape and have a notochord extending the length of the body, beginning in the head; hence the name *Cephalochorda*. The notochord is situated between the nervous system and the digestive canal. The central nervous system lies entirely on one side of the digestive canal, while numerous gillslits extend from the pharynx to the exterior.

CEPHALONIA, sĕf-ą-lō'nĭ-ą, or **CEPHALLENIA,** an island of Greece, the largest of the Ionian Islands, northwest of the Morea, at the entrance of the Gulf of Patras, about 31 miles in length and from 5 to 12 in breadth; area, about 266 square miles; between lat. 38° and 38° 31′ N. and long. 20° 21′ and 20° 49′ E. The coastline is very irregular and deeply marked with indentations, and the surface is rugged and mountainous, rising in Monte Negro, the ancient Ænos, to a height of 5,380 feet. There is rather a deficiency of water on the island. The principal towns are Argostoli, the capital, and Lixuri. The chief exports are currants, oil and grain; wine, cheese, etc., are also exported. The manufactures are inconsiderable, consisting of some cottons, carpets of mixed wool and goats'-hair, with some potteries and distilleries of liqueurs. The island is subject to frequent earthquakes. One of the most destructive was that of the year 1867. The greater part of the population are of the Greek Church; the others belong to the Catholic Church. By Homer the island was called Same or Samos, though he speaks of the inhabitants as Cephallenes. The island adhered to Athens during the Peloponnesian War. In 189 B.C. it came under the Roman dominion and after the division of the empire it became subject to the Byzantines. In the 12th century it was taken by the Normans, and afterward fell successively into the hands of the Venetians and Turks, and then again into the hands of the Venetians, who retained possession of it until 1797, when the French seized it. From 1815 it belonged to the republic of the United Ionian Islands, and in 1864 was united with the other islands to the kingdom of Greece. With Ithaca and a few other adjacent islands it forms a nomos or province of the kingdom of Greece. Pop. of nomos 83,363; of the island about 72,000.

CEPHALOPODA, a class of mollusks represented by the squid, cuttle-fish, octopus, nautilus, argonauts, etc. In these mollusks the head-lobe bears arms or lobes, as the animal has no «foot» or creeping-disc like that of other mollusks, though its homologue is found in the siphon and tentacles. They have an unpaired muscular mantle, which forms the walls or outside, so that as in the squids, where there is no outer shell, the body is naked. The nervous system is much concentrated, for not only are the cerebral ganglia, pedal and visceral ganglia in the head, but also the ears and osphradia, or olfactory organs. The large complicated brain, thus composed of the three primary pairs of ganglia with some accessory ones, are enclosed in a cephalic cartilage which suggests a comparison with the cartilaginous skull of the lamprey and sharks. In the body behind are the sympathetic and stellate ganglia. The eyes as a rule are highly developed, with a retina, choroid, iris, cornea, vitreous body and lens. The gills are well developed, either as one or two pairs situated within the mantle-cavity. The water is forced from the mantle-cavity, which is open behind the head, through the siphon. There are two kinds of hearts. The systematic heart consists of two or four (nautilus) auricles receiving the blood from the gills, and a median ventricle from which arise the anterior and posterior aortæ. There is also, at the base of each gill, a branchial heart, which receives the blood from the vena cava and pumps it into the gill. These branchial hearts are not known to exist in other mollusks, and no other mollusks possess an ink-sac. The armature of the mouth, however, as in gastropods, consists of two horny jaws, enormous in most cephalopods, and an odontophore with its lingual ribbon for cutting flesh, etc. In many forms one of the arms of the wall is peculiarly modified for sexual purposes — the so-called *hectocolylized* arm. The eggs in developing undergo a superficial or discoidal development; and the young undergo no metamorphosis. The shell of cephalopods is either chambered, as in orthoceratites, nautiloids and ammonoids, or, as in argonauts, forms a simple deep basin; in all the *Dibranchiata* it is at least partly internal. In the squids and cuttle-fish it takes the form of an internal pen or «bone.»

The cephalopods are divided into two orders, according to the number of their gills:

Order 1. *Tetrabranchiata.*— This group, in which the gills are four in number, is represented by the nautilus, the sole living representative of a number of fossil forms, such as *Orthoceras, Goniatites* and *Ammonites. Nautilus pompilius* and *Nautilus umbilicatulus* are the only survivors of about 1,500 extinct species of the order. See NAUTILUS.

Order 2. *Dibranchiata.*— The dibranchiates are so called from possessing but two gills, while the tetrabranchiates had, as in *Nautilus,* numerous unarmed tentacles; these are now represented by 10 (*Decapoda*) or 8 (*Octopoda*) arms, provided with numerous suckers. To the 10-armed forms belong *Spirula,* a diminutive cuttle with an internal coiled shell. The shells of *Spirula peronii* are rarely thrown ashore on Nantucket; it lives upon the high seas. The extinct Belemnites had, like the recent *Moroteuthis,* a straight conical shell, the "thunderbolt" fossil. Allied to *Loligo* and *Ommastrephes* are gigantic cuttle-fishes which live in mid-ocean, but whose remains have been found at sea or cast ashore on Newfoundland and the Danish coast. Their jaws also occur in the stomachs of sperm whales.

Fossil Cephalopods.— The greater proportion of cephalopod mollusks are fossil. They began to exist in the Cambrian period, and, as nautiloids and ammonoids, flourished in great profusion in the Palæozoic and Mesozoic eras, the ammonites (q.v.) of the Jurassic and Cretaceous beds numbering about 5,000 species. For bibliography see MOLLUSCA.

CEPHALULA, sĕf-ą-loo'lą, the name applied by Packard to the stage of the embryos of mollusks and of worms immediately succeeding the gastrula (also the trochosphere) when the larva is still a surface-swimmer and the head is beginning to be formed. Consult Packard, 'Life-Histories of Animals,' p. 94.

CEPHALUS, sĕf'ą-lŭs, the son of Creusa; according to some the son of Deion, King of Phocis, and of Diomede. He was the husband of Procris, or Procene. Shortly after his marriage Eōs (Aurora) carried off the beautiful youth while he was hunting on Mount Hymettus. He refused the love of the goddess, who induced him to put the virtue of his wife to a trial which it could not withstand. Procris, in return, tempted him likewise, and he yielded also. Learning their mutual weakness, they became reconciled. But Procris subsequently became jealous of her husband, and concealed herself in a wood to watch him. He mistook her among the leaves for a wild animal, and killed her with a javelin.

CEPHAS, sē'fąs, a surname given by Christ to Simon. In the Greek it is *πέτρος* ("a rock"), in Latin *Petrus,* and in English Peter.

CEPHEUS, sē'fūs, a king of Ethiopia and husband of Cassiopeia; his name was given to a constellation of stars in the northern hemisphere, surrounded by Cassiopeia, Ursa Major, Draco and Cygnus. See CASSIOPEIA.

CEPHISSUS, the name of three rivers of Greece. (1) A river which waters the Athenian plain. It rises on the west slope of Mount Pentelicus and the south side of Mount Parnes and flows past Athens on the west into the Saronic Gulf near Phalerum. (2) A river of Attica emptying into the Gulf of Eleusis. (3) A river flowing through eastern Phocis and northern Bœotia and emptying into Lake Copais (Topolias).

CERACCHI, chă-rä'kē, **Giuseppe,** Corsican sculptor: b. on the island of Corsica, 4 July 1751, or, according to others, about 1760; d. Paris, 29 Jan. 1801. In 1798 he took part in establishing the republic of Rome, of which he was among the warmest partisans. On the re-establishment of the papal authority he was obliged to leave Rome, and went to Paris, where he was employed in making a bust of the First Consul. Nevertheless, he joined the young French artists whom he had known at Rome, and whose ardent republican opinions coincided with his own, in a conspiracy against Bonaparte, in whom he saw only the oppressor of his country. On 9 Nov. 1800 he was arrested at the opera, with Arena, Damerville and Topino Lebrun. Before the tribunal he answered only in monosyllables to the questions put to him. He was sentenced to death, together with his accomplices, and ascended the scaffold with great firmness. The death of this disciple, and almost rival, of Canova, was a great loss to sculpture.

CERAM, sĕ-răm', **CEIRAM,** or **ZERAM,** called by the natives Zeram or Serang, an island of the Moluccas, the second of the group in size, lying west of New Guinea, between long. 127° 55′ and 130° 50′ E. and lat. 2° 45′ and 3° 40′ S., in the Indian Archipelago; area, about 7,000 square miles. Its interior is traversed by mountain ranges from 6,000 to 8,000 feet high, and culminating in Noosaheli, which is 9,600 feet. The vegetation is luxuriant and gigantic, some of the sago palms growing 100 feet high. Sago forms the chief food of the inhabitants and is an article of trade. The inhabitants of the cost are of Malay origin, and have extensive fisheries. The interior is peopled by Alfoories or Alfuros, long known for their barbarous custom of using human skulls for public and private ornament, and the still more barbarous atrocity of committing murder in order to procure them. They are said to have become more civilized, and many of their rajahs have adopted the European dress and manners. They are divided into various independent tribes. Christianity has been introduced into several villages on the south coast, but not with any great success, though it is said that in some of the villages a considerable number of those professing Christianity can now read and write. At Amahai is the only good harbor, although Sawaai on the north is frequented by whalers. The island belongs to the Dutch, who have established several stations there under the charge of an official residing at Wahai on the north coast. The country is governed by native chiefs under Dutch supervision. Pop. estimated at 100,000.

CERAMBYCIDÆ, sĕ-răm-bis'ĭ-dē, a family of beetles of great extent, readily known by their very long antennæ, which give its members the name of "longicorns." The family already numbers some 12,000 or 13,000 species, though probably not over half of the existing forms are known. It comprises some of the largest, most showy, as well as the most destructive insects of the sub-order. They are readily recognized by their oblong, often cylindrical bodies, the remarkably long, filiform, usually recurved antennæ and the powerful in-

curved mandibles. Their eggs are introduced into cracks in the bark of plants by the long, fleshy, extensile tip of the abdomen. The larvæ are long, flattened, cylindrical, fleshy, often footless, whitish grubs, with very convex rings, the prothoracic segment being much larger and broader than the succeeding, while the head is small and armed with strong, sharp mandibles adapted for boring like an auger in the hardest woods. These borers live from one to three years before transforming, at the end of which time they construct a cocoon of chips at the end of their burrows, the head of the pupa lying next to the thin portion of bark left to conceal the hole.

The species of the American genus *Oncideres* are called girdlers, because the parent beetle, after laying an egg in a small branch, girdles this round with a deep incision, so that the portion containing the larva sooner or later falls to the ground. The growth of a longicorn larva frequently takes more than a year, and under certain circumstances it may be enormously prolonged. *Monohammus confusor* has been known to issue from wooden furniture which was 15 years old. Individuals of another longicorn have issued from the wood of a table 20 and even 28 years after the felling of the tree from which it was made. Watson has related a case from which it appears probable that the life of a longicorn beetle dwelling in household furniture extended over at least 45 years. It is generally assumed that the prolongation of life in these cases is due to the beetle resting quiescent long after it has completed the metamorphosis; but more probably it is the larval life that is prolonged; the larva continuing to feed, but gaining little or no nutriment from the dry wood in these unnatural conditions. A large number of longicorns stridulate loudly by rubbing a ridge inside the pronotum on a striate surface at the base of the scutellum. A few produce noise by rubbing the hind femora against the edges of the elytra, somewhat after the fashion of grasshoppers; and some possess highly developed stridulating surfaces on the hind and middle coxæ.

CERAMICS. The fictile art; the art of the potter. The word ceramics is derived from the Greek *keramos,* the potter's clay. It is often spelled *keramics* following the Greek spelling direct, instead of taking the word from the French *céramique.* The subject ceramics can be primarily divided into two basic divisions: (1) the technique; (2) the product. The essential features of the technique are the selection and preparation of the clay; the manipulation of a lump of the clay into its desired form: by hand unaided (as done by primitive peoples), by "throwing" on the potter's wheel, by molding soft clay in a form or mold. And, lastly, the baking of the clay in its acquired form either in the sun or in an oven. Formerly, the entire product of the potter was included in the term "pottery." Among experts, recently, it has become usual to divide all the wares into two classes, "pottery" and "porcelain." In this system of the connoisseur's and collector's nomenclature the term "pottery" includes all classes of *earthenware* and *stoneware.* By this method we bring the different earthenware products, terra cotta, majolica, faience, Delft, etc., together with stoneware under one generic class — *pottery.* Additional refinements to the crude primitive fictile ware are *glaze* and *decoration.*

Technical Terms.— A few of the technical terms used for the above processes in production may be here concisely defined as follows: Paste (French *pâte*) is the material of which the fictile ware is constructed; it is often termed *body.* The bare body baked is termed *biscuit. Glaze* is the glassy coating given to the outer or inner surface of the ware. Paste or body may be either "hard" or "soft," the former term indicating that it is not easily scratched with a steel point, and the term *soft* implies that the metal point, or a file, easily abrades the surface. Glaze may be either translucent or opaque. The former is a kind of glass (silicate of soda or potash), usually, or is produced by throwing table salt (chloride of sodium) into the hot oven when it creates a chemical action on the surface of the incandescent clay, producing "salt glaze." The addition of oxide of lead to the silicate of soda or potash produces a more brilliant and easier fusible, but softer, glaze (*plumbiferous* or lead glaze). By adding oxide of tin to the translucent glaze material, it becomes white and opaque (*stanniferous* glaze). Earthenware has a porous body which is permeated by liquids; this defect may be corrected by glazing or by dipping into a fine liquid clay, termed *slip* or *engobe,* and then baked. By adding certain metallic oxides (as coloring matter) ground with fusible glasses a colored glaze or pigment is produced. When rendered opaque with tin oxide, this vitrifiable composition is termed *enamel,* and is used as a glaze or as a medium for painted decoration to be fused to the surface of the ware in the oven. When a glaze, through faulty firing or defective composition, cracks into numerous parts divided by crevices it is termed *crazed.* When the same effect is caused intentionally, the term *crackle* is used. Crazed glaze is liable to keep peeling off from time to time, also to increase the number of fissures. Crackle is a permanent effect and considered decorative. Ware decorated with enamel coating is called *faience,* or, quite commonly, *majolica.* The latter term, however, correctly belongs to the enamel art ware, derived from old Arabic and Moorish methods, made in Italy. (See MAJOLICA). Some small, delicate low relief decoration is done by drying liquid clay in a mold or form, or by stamping; when well set it is applied by hand to the body of the ware, and is known as *sprigging.*

History.— Proof of the great antiquity of the potter's art is found in the fact that fine, gracefully formed fictile ware was produced in Egypt before the potter's wheel was known, some pieces being painted by hand. The process of covering clay vessels with hard glass glaze was used in the time of Egypt's first historic king, Mena, over 7,000 years before Christ. In 1500 B.C. the Nile potters used glazes of seven different colors, greenish-blue predominating. The excavations at Nineveh brought to light wall-tiles having polychrome enamel coating. Cyprus was a connecting link between Egypt and East Asia, and we, accordingly, find Cypriote clay vessels of grayish yellow with brown paintings, some with Egyptian tenden-

cies, others of Grecian or East Asiatic styles. Excavating the hill of Hissarlik (ancient Troy), Schliemann and others discovered clay vessels of a cultured people. Best known of ancient fictile wares are the beautifully formed and decorated Greek vases (long called erroneously Etruscan) of terra cotta coated with thin black polished glaze. The Arretine ware, made from the read earth of Arretium, was highly prized by the Romans. In the East, clever ceramic work was done by the ancient Chaldeans, Assyrians and Persians, as their lovely hand-painted enamel tiles testify. But in the Far East the Chinese had arrived very early at a quite advanced stage of perfection of the ceramic art. The earliest pieces we know of date from the Han period (206 B.C.—220 A.D.) with early earthenware *celadon* (see CHINESE CERAMICS) attempting imitation of their beloved Jade stone, advancing to the discovery of stoneware, then porcelain (see PORCELAIN) in the early Ming dynasty (middle 14th century A.D.). The wide range of discovery and invention in ceramics of the ancient Chinese is ever a matter marveled at by Western connoisseurs, with their lovely crackle, flambé (transmutation), self-colors and numerous other glaze effects; their delicate egg-shell ware, much admired blue-and-white, Kang-Hsi polychrome, highly decorative motifs of symbolism and mythology; which latter ware represents the bulk of the pieces in our private collections and museum exhibits. These attractive wares of the royal Chin-tê-chên ovens have been actively bid for by the wealthy Westerners. The opening up of railroads in republican China has brought to light great quantities of ancient ceramic pieces of great beauty that were reposing many centuries in graves. Their presence in the markets has revolutionized the aims of the wealthy collectors, and ancient celadon is having its previous mysteries solved.

The Japanese declare they received their first knowledge of art pottery from the Koreans, but Western experts place their earliest glazed pieces not earlier than the 12th century A.D., and state that Kato Shirozaemon, in the 13th century, brought (after six years' study in China) over ceramic refinement to a factory at Seto. The connoisseurs at Nippon, with their "tea ceremonies," loved and revered the ancient homely earthenware of their tea service, and show little respect for the cold white glitter of porcelain. They produced none till that of the 16th century by Shonzui. The Japanese egg-shell china excels, some claim, even the Chinese, in thinness, transparency and brilliance; their drawing and color work are perfection. Peculiar to this nation are the painting in lacquer on porcelain, the cloisonné enamel china decoration. Greatly admired of European collectors is their ivory-glaze Satsuma faience.

Little wonder is it that India and Persia took to imitating the styles of Chinese decoration. For Europe, once seeing the ware, quickly acquired its "Chinese taste" craze. From the 16th and into the 18th century immense quantities of Chinese and Japanese porcelain ware were brought into Europe by the Dutch and the East India trading companies' ships. These wares at first had genuine Chinese art in their decoration as well as Chinese form; but soon the traders had European ideas grafted on to made-to-order pieces and the truly Oriental style became obscured in a hybrid product.

Somewhere between the 9th and 12th centuries the Persians learned to make lustre decoration (mezza majolica) and we get here the so-called "Rhodes-Persian faience," Osmanli-Turkish. From Arabia came the knowledge of enameling clay vessels into continental Europe, an art known in the East from very early times, as is proved by her ancient polychrome hand-painted tiles for walls and ceilings in her mosques. We find these same tiles and enameled vases, etc., in opalescent metallic lustre in the true Arabian decoration, in Spain, in the old Hispano-Moresque buildings. And it was, probably, from these same conquering Moors that Italy obtained (through the island of Majorca) this tin enamel polychrome decoration process (see MAJOLICA), which from the 15th century became a greatly popular fictile art in Italy. In the 15th century, Faenza, Pesaro, Gubbio, Urbino, Castel Durante, had majolica ovens. In this early Renaissance period the Della Robbia sculptor family created their earthenware busts enveloped in tin-glaze (the so-called *terra invetriata*), Luca della Robbia claiming the discovery of using tin-glaze enamel to cover his statuary. In the 16th century we have Gubbio, with its genius, Maestro Georgio, as centre of Italian majolica manufacture, with its ruby lustre; and the clever artist Orazio Fontana was working on this ware in Urbino. The madre-perla lustre belongs to this time. The *sgraffiti* decoration belongs to this period with its engobe coating scratched through to the body and finished in colored glaze.

In Germany glazed earthenware developed with its oven tiles (Kachel) and Cologne (about 1530), then Nuremberg, produced its falsely termed "Hirschvogel" jugs with their reliefs and colored glaze, to disappear in the 17th century. Next we find Germany producing smooth painted surface enamelware and (end of 16th century) the noted Rhenish salt-glaze stoneware (*Steinzeug*) was made in Cologne, then Siegburg, Frechen, Raeren, Grenzburg, etc., with its quaint applied relief decoration, and odd forms, such as "ring" vases, etc. This ware was long known as *grès de Flandres*. In France Bernhard Palissy, ignorant of the chemistry and practice of the ceramist, after many disastrous failures, produced an enamel decoration (see PALISSY) of brilliance and achieved fame through his naturalistic animal and plant representations in relief on plates, etc. In the middle of the 16th century arose the deservedly noted Henri Deux ware of Saint Porchaire with its intricate, yet artistic, strapwork inlays of brown clay on yellowish body, and its *sprigged* masacarons and other reliefs. At the end of the 16th or beginning of the 17th century Nevers started making true French faience, soon arriving at an extended palette of glaze colors to cover the porous body with polychrome decoration. Rouen soon followed, assisted by Nevers artisans. (See ROUEN). Early in the 18th century Moustiers made such faience, and we find large faience factories at Bordeaux, Paris, Sinceny, Strassburg, Marseilles, Niderviller, Lille, etc. Talavera and Alcora in Spain produced this ware; Germany in Nuremberg,

Hoechst, Frankenthal, etc. But already in 1680 Delft, Holland, had 30 potteries producing opaque enamel glazed tiles, and was soon shipping abroad large quantities of ware imitating the Chinese blue-and-white decorated ware that was becoming so popular. See DELFT.

England in the 17th century was making no fictile wares worth comment. Her upper classes were using imported Delft and German stoneware (termed by them Cologne ware). The Staffordshire potteries had a considerable output of low-priced roughly modeled wares, termed these days "peasant pottery.' Tygs, puzzle jugs, posset pots, "cottage ornaments", etc., were their art (?) or showpieces. Their decoration was done in raised slip poured from a spout or "quill" (like confectioners' work). By 1673, John Dwight had started a factory at Fulham, where he made a very fine stoneware (termed "Cologne ware") and some truly artistic delicately executed statuary. About 1691, the two brothers Elers, from Holland, started making very fine salt-glazed stoneware in Staffordshire. It was of the finest texture body and perfect execution with *sprigged* (stamped) decoration. Following in the Elers path came Astbury, Thomas Wedgwood, Ralph Shaw (1733). A white Derbyshire clay produced "Crouch ware" till 1720. Bristol, Vauxhall and Lambeth also made salt-glaze stoneware, and Burslem (Staffordshire), by 1750, had 60 small factories, and exports to Holland and Germany were large. Enamel polychrome decoration and gilding was done on some of this stoneware. By 1780 cream-colored earthenware had taken the place of stoneware and came into use over the entire civilized world, the industry propagated by Warburtons, Wedgwoods, Turners, Mayer and other Staffordshire potters. Thomas Whieldon, between 1740 and 1780, produced clever vari-colored pastes (agate, tortoiseshell, etc.) and novel forms. Josiah Spode (Whieldon's apprentice) and his son became noted for their "black basalt," cream color, transfer-print decoration, jasper and other wares. Josiah Wedgwood and his contemporaries, John Turner, Henry Palmer, Josiah Spode, Ralph Wood, in the middle of the 18th century brought the earthenware product of the Staffordshire potteries to a stage of fine art. Wedgwood's most famous ware was the beautiful *jasper* (of his own invention) in vases, plaques, medallions, etc., displaying the lovely reliefs of Flaxman and other artists. Other bodies were "pearl" ware, Queen's ware, basalts, "encaustic" (imitating Greek terra cottas) emanating from Wedgwood's factory, "Etruria." Liverpool turned out its tin enameled (Delft) ware, and, by 1755, Sadler and Green had established the reputation of their transfer-print decoration process, and the "Herculaneum" factory made prolific quantities of artistic stoneware. Leeds was noted for its cream colored ware; Swinton produced "brown china" with its "Rockingham" glaze. Other well-known earthenware potteries were at Newcastle, Sunderland, Bristol (see BRISTOL), Derby (see DERBY), Swansea, Mortlake, Caughley (Salopian ware) with its "willow pattern," Coalport, etc.

Chinese porcelain ware was still a costly luxury, and, while Delft proved a less expensive, clever substitute, the European ambition was to produce its own true porcelain. Lacking the requisite earths imitations they attained large proportions in faience (enamel) ware made in the factories of Strassburg, Frankenthal, Nuremberg, Hoechst, in Germany; Milan and Capo di Monte, in Italy; Roerstrand and Marieberg, in Sweden; Lyons, Niderviller, Lüneville, Lille, Saint Cloud, Sceaux, Marseilles, in France.

European Porcelain.— The ever increasing shipments of porcelain from China at ever declining cost in the 18th century brought failure to the European faienceries. The Oriental competition forced further researches for true-porcelain earths. Florence, in the 16th century, had for a few years produced soft (artificial) porcelain. Saint Cloud, by the 17th century, was making an artificial porcelain, and rival factories started up at Mennecy, Chantilly and Vincennes, in France. The latter plant was moved, in 1756, to Sèvres, where Louis XV took it over and subsidized it. It produced work of the highest style of the art in a lovely mellow body of artificial porcelain. In 1768 kaolin earth was discovered in France and by 1772 was producing its noted delicate soft porcelain. See SÈVRES; PORCELAIN, etc.

But Boettger, in Germany (1708), discovered the true porcelain earth first, and a factory was established at Meissen (near Dresden), soon to be shipping its wares through Europe. (See DRESDEN). In spite of the Meissen workers being kept in military seclusion, the secret of hard porcelain manufacture leaked out, and we find porcelain factories opened in: Vienna (1718); Capo di Monte (1742); Saint Petersburg (1745); Hoechst (1746); Fuerstenberg (1746); Berlin (1750); Frankenthal (1755); Nymphenberg (1758); Ludwigsburg (1758); Copenhagen (1756); Madrid (1760), known as Buen Retiro. In England porcelain was first made, in 1730, at Bow; it was artificial body, largely glass and ground Chinese porcelain (some American clay). William Duesbury purchased the factory in 1776, when it was removed to Derby. (See Bow). Chelsea made soft porcelain from 1745, or earlier. William Duesbury purchased the works in 1770 and ran it till 1784, when it was removed to Derby. (See CHELSEA.) The Derby soft porcelain factory ran from 1756 to 1849. (See DERBY). At Worcester a factory was started in 1751. It made artificial porcelain till 1783, then hard porcelain. Robert Chamberlain started an opposition factory about 1789. The two factories combined in 1840. Thomas Grainger established a factory in Worcester soon after 1801. Several partnership changes were made, after which Grainger ran the factory himself till his death in 1839. (See WORCESTER.) William Billingsley (a decorator from Worcester and Derby factories) started a factory in 1796 at Pinxton, but left in 1800 and started another factory at Nantgarw, in 1811, which was closed in 1814. These factories of Billingsley made ware from his wonderfully translucent but hopelessly costly, glassy paste formula. Swansea, besides earthenware, produced, from 1814, translucent (porcelain) ware under Billingsley's formula for several years. Lowestoft produced a soft paste porcelain in 1756 and continued, probably, till 1761. The pseudo-Lowestoft porcelain beloved of American collectors is pure Chinese hard porcelain.

England's first production of hard (true) porcelain was started through the discovery of kaolin (about 1758) by William Cookworthy of Plymouth. A factory was started there in 1764, to be purchased (1770) by Richard Champion, of Bristol, and soon moved to the latter city. (See PLYMOUTH). Bristol porcelain, likewise, was a financial failure and Champion sold out the factory (1781) to a New Hall pottery.

Modern Ceramics.—Bone porcelain (called also "standard" porcelain) became a regulation factory paste composition, used by all English factories, when (1800) Josiah Spode's son started the use of the simple mixture of bone-ash, china stone and china clay. The ease gained and the low price of production of bone porcelain ruined all competition against it, and it remains standard to this day. Royal Worcester and Crown Derby wares are still leaders in Great Britain in art products. The Wedgwood factory (Etruria) continues its output of jasper and other fancy wares. Other leading potteries of this and last century are those of Mintons (see MINTONS), and of Copelands and Doultons stoneware potteries. Italy produces many imitations of the old pieces. Sèvres continued producing the finest art work in soft porcelain, until (under Brongniart), about 1800, she turned to making hard paste body. In the last century Sèvres worked out a cameo style of relief (*pâte sur pâte*) which Solon did master work on, till 1870, when he continued the delicate method at Mintons. In France Theodore Deck and Taxil Doat became renowned creative ceramic artists. Sèvres revived (in 1850) faience making alongside of her superb porcelain ware. (See SÈVRES). French modern faience, in its perfect technique and beautiful painted decoration, takes a place in the plastic arts alongside the finest porcelain. Limoges grew to become a leading porcelain centre in the last century; the great American factory of Havilands is there. Berlin enlarged her ceramic palette and has done rich relief work in colored plant life and figures. The Berlin "transparencies" in delicate porcelain relief became famous; her dipped then fired lace produces clever effects. The pottery was removed to Charlottenburg in 1870. Seger's researches into Oriental processes produced a flambé and a sang de bœuf glaze of great beauty. See CHINESE CERAMICS.

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CLEMENT W. COUMBE.

CERARGYRITE, native chloride of silver, AgCl. It crystallizes in the isometric system, and is cubical in general habit. It has a specific gravity of 5.55, and is quite soft, with a grayish color and a resinous lustre. Upon exposure to light its color changes to a violet-brown. It occurs in Mexico, in western South America, in Norway and in the Ural Mountains. In the United States it is found in Idaho, Utah, Colorado, Nevada and Arizona. When found in quantity it is valuable as an ore of silver.

CERASTES, a genus of African vipers, remarkable for their fatal venom, and for two little horns formed by the scales above the eyes. Hence they have received the name of horned vipers. The tail is very distinct from the body. *C. cornutus* is the horned viper or asp of northern Africa, a species known to the ancients. There are several other species.

CERASUS, a genus of trees, the cherries, of the order *Rosaceæ,* now always regarded as a section of the genus *Prunus,* distinguished from the other sections by the smooth, bloomless fruit conduplicate vernation and other characters. See CHERRY.

CERATES, certain official preparations of the United States Pharmacopœia. They are unctous substances, consisting of oil, lard or petrolatum mixed with wax, spermaceti or resin, to which various medicines may be added. In consistency they are harder than ointments and softer than plasters, and should be capable of being spread at ordinary temperatures on cloth, and should not melt at the temperature of the human body.

CERATODUS, sĕ-rat'o-dus, an extinct genus of fishes belonging to the *Dipnoi* (q.v.) or lung-fishes. Its nearest extant relative is *Neoceratulus,* the barramunda or native salmon of the Australian rivers, measuring from three to six feet in length. This fish can breathe air, and can consequently live in water too foul for other fishes, but cannot live on land.

CERATOSA, certain sponges in which the skeleton or solid support is horny. Another name is *Ceratospongiæ.* The skeleton consists of spongin, which differs chemically from the substance of true horn (keratin). The spongin is deposited in long fibres by peculiar cells (spongioblasts). The fibres interlace, branch and unite into the supporting framework of the sponge. Examples of the horny or fibrous sponges are the bath-sponges, such as *Euspongia officinalis,* varieties of which occur in the Mediterranean and about the West Indies, Florida, etc. See SPONGE.

CERATOSAURUS, sĕ-ra-tō-sôr'ŭs, a carnivorous dinosaur (see DINOSAURIA) resembling Allosaurus (q.v.), but of smaller size and with small horns over the eyes and on the nasal bones. It is found in the Como formation of Wyoming (Upper Jurassic Period).

CERAUNIAN, MOUNTAINS, in classical geography: (1) A mountain range in the southeastern part of the Caucasus Mountains, the exact position of which is not known; (2) a chain of mountains in Epirus, northern Greece, extending to the Adriatic and forming the peninsula Acroceraunium (q.v.). The mountains themselves are also called Acroceraunia, and are now known as Khimara.

CERAUNOGRAPH, from the Greek *keraunos,* thunder and lightning, and *graphein,* to write, an instrument for the automatic recording of the number, time and intensity of lightning flashes during thunderstorms. The instrument is made in several forms, but all are modifications of the recording apparatus of the wireless telegraph, suggested by the fact that it was a wireless telegraph instrument which automatically made the first thunderstorm record (in 1898). As with the wireless, the vibrations are transmitted by the Hertzian waves, caught by an antenna, and conveyed to a coherer and thence to the recording apparatus. The instrument may be arranged for long distance observations, up to 600 miles. The ceraunograph has been combined with the barograph so that the records of both instruments appear on the same chart. The name of the instrument was given to it by Father Odenbach of the Saint Ignatius College Meteorological Observatory, and his investigations appear in the annual reports of that institution for the years 1902, 1903, 1906 and 1907. Consult also the United States Weather Bureau's 'Monthly Review' for 1906, p. 273.

CERBERUS, sẽr'bẽ-rŭs, in Greek myths, a three-headed dog, with snakes for hair. Hesiod describes him as 50-headed, and states him to have been the offspring of Echidna by Typhon, the most terrible of the giants that attempted to storm heaven; but later writers give him only three heads and a tail or mane of serpents. At his bark hell trembled, and when loosed from his hundred chains, even the Furies could not tame him. He watched the entrance of Tartarus, or the regions of the dead, and fawned on those who entered, but seized and devoured those who attempted to return. He was subdued by Heracles (Hercules).

CERCARIA, sẽr-kā'rĭ-ą, the larva of the fluke-worm and other trematode parasites. The body is tadpole-like in shape, with an interior and posterior sucker, a mouth and pharynx, and a forked intestine. The *Cercariæ* are developed in the body of the parent-nurse (*redia*). Escaping from the redia, the cercaria, swimming about in pools or ponds, forces its way into the body of some snail, which forms its first host. Then, losing the tail, it becomes encysted, attached to blades of grass or herbage. The transference of the larval fluke to its final host, the sheep, is effected if the latter swallow the grass on which the cercaria has become encysted. The young fluke then escapes from the cyst, and forces its way up the bile-ducts to the liver, in which it rapidly grows, and developing reproductive organs, attains the adult conditions. See TREMATODA.

CERCIS, sẽr'sĭs, a genus of plants of the order *Leguminosæ. C. canadensis,* redbud, or Judas-tree, is a small ornamental tree, often cultivated, but growing wild from New York south to Florida and west to Minnesota, Kansas and Louisiana. *C. siliquastrum,* a native of the south of Europe, and of several countries in Asia, is a handsome, low tree with a spreading head. The leaves are remarkable for their unusual shape; they are of a pale, bluish-green color on the upper side, and sea-green on the under. The flowers, which have an agreeable acid taste, are often mixed in salads, and the flower-buds are pickled. The genus received the name of the Judas-tree from the tradition that it was upon a specimen of it, near Jerusalem, that Judas hanged himself.

CERCOPITHECIDÆ, sẽr-kō-pĭ-thē'sĭ-dē, a family of primates, including all the Old World monkeys, except the anthropoid apes. The various groups and species may be found described under their names. See also MONKEY.

CERCYON, a famous robber, killed by Theseus.

CERDIC, kẽr'dik, founder of the West Saxon kingdom: d. 534. He was a Saxon earldorman who invaded England in 495, and after gradually fighting his way and extending his conquests, established the kingdom of Wessex about 519. He won a great battle at Charford in 519, but suffered a severe defeat from the Britons in 520 at Mount Badon, or Badbury, in Dorsetshire. In 530 he conquered the Isle of Wight. At his death his kingdom extended over the present counties of Berkshire, Wiltshire, Dorsetshire and Hampshire (including the Isle of Wight). All the sovereigns of England, except Canute, Hardicanute, the two Harolds and William the Conquerer are said to be descended from Cerdic. Consult Bede, 'Historia ecclesiasticæ gentis' (bk. 5, ed. C. Plummer, Oxford 1896); Gent, E., 'Origines Celticæ' (London 1883); Green, J. R., 'The Making of England' (London 1897).

CERDONIANS, an ancient sect, whose belief, half philosophical, half religious, was a confused mixture of Christian dogmas with Oriental dualism and Gnostic ideas. Their founder, Cerdo, was a Syrian, who came to Rome about the year 139 under the pontificate of Hyginus. He maintained the existence of the Zoroastrian two principles, one of absolute good and the other of absolute evil. The latter, according to him, was the creator of the world and the God and lawgiver of the Jews. The former was the creator of Jesus Christ, whose incarnation, sufferings and death were only sensible appearances, and not vital facts. Because they believed the human body the work of the evil Deity, the Cerdonians prohibited the eating of flesh, marriage and wine, and considered the ascetic life the highest spiritual life. His disciples became confounded with those of Marcion, who some years later propagated similar opinions.

CÉRÉ, sā-rā, **Jean Nicolas,** French botanist: b. Isle of France 1737; d. there, 2 May 1810. Under the direction of the French government he greatly extended the culture of spices in the Isle of France (now Mauritius), when that island was a French dependency. The Agricultural Society of Paris published his essay on the culture of rice and awarded him a medal; and Napoleon confirmed him in his position as director of the botanical garden of the Isle of France, and conferred on him a pension of $120. A tree of the island has been called after him, Cerea.

CERE, sẽr, the naked skin or fleshy sheath that covers the base of the upper mandible in some birds, through which it is supposed that a tactile sense is exercised.

CEREALIA, sẽ-rẽ-ā'lĭ-ą (from Ceres, the goddess of the fields and of fruits), signified the productions of agriculture, also the festivals

of Ceres, celebrated at Rome. The time at which they were celebrated is not known. According to some it was the 12th of April; according to others the 7th of the same month.

CEREALS, a term derived from Ceres, the goddess of corn. Though sometimes extended to leguminous plants, as beans, lentils, etc., and to buckwheat, it is more usually and properly confined to the *Gramineæ,* as wheat, barley, rye and oats, which are used as human food. In agriculture they are usually considered as exhausting crops, partly on account of their trailing roots; their mode of nutrition, which is effected more by the roots than by the leaves; their slender stems, which allow weeds to grow up and rob the soil; and from the necessity of allowing them to attain full maturity before they are reaped. Accordingly it is considered one of the rules of good husbandry not to take two cereal or white crops in succession, but to make them alternate with root crops, which, growing in rows at some distance apart from each other, have the additional advantage of allowing weeds to be destroyed by means of repeated hoeings. See BARLEY; BUCKWHEAT; GRAIN; GRAIN, HANDLING AND TRANSPORTATION OF; GRASSES IN THE UNITED STATES; CORN, INDIAN; MILLET; OATS; RICE; RYE; SORGHUM; WHEAT.

CEREBELLUM, sĕr-ę-bĕl'ŭm ("the little brain"), that portion of the brain situated behind and beneath the cerebrum. It is connected with the main brain mass by means of two feet or stems, the cerebellar peduncles, and is separated from the main brain mass in the cranial cavity by a thick layer of connective tissue, the tentorium cerebelli. It is also connected with the pons by a pair of middle peduncles, and with the medulla oblongata by the inferior peduncles. It thus forms a very integral portion of the brain mass. In general the form of the cerebellum in human beings is a flattened ovoid measuring from 8 to 10 centimeters from side to side, five to six centimeters from before backward, and five centimeters vertically. Its average weight is about 140 grams, which is one-eighth of the weight of the whole cerebrospinal axis. It is larger and heavier in the male than in the female, and is relatively larger in the adult than in the child. Like the brain, it is divided up into a number of lobes, of which three are most prominent, the middle portion or vermis, and the two lateral lobes. The minute structure of the cerebellum is somewhat similar to that of the cerebrum, but there are certainly very marked differences, particularly in the development of a layer of very characteristic cells, the Purkinje cells. The interior of the cerebellum contains masses of gray matter, or nuclei. These are the dentate nucleus, the nucleus emboliformis, nucleus globosus and the nucleus fastigii in the vermis. Through the inferior, middle and superior peduncles fibres pass to and from the cerebrum, pons, medulla and spinal cord, thus bringing the cerebellum into organic union with the rest of the nervous system. The functions of the cerebellum are not yet completely worked out, but it is certain that the cerebellum has a number of important functions, chief among which are those connected with locomotion and the act of balancing, i.e., the orientation of the body in space. It is termed by Sherrington the chief head ganglion for the proprioceptors, or those organs which give rise to the sense of position of the human body. The chief symptoms of cerebellar disease, either from maldevelopment or new growths, are: Cerebellar ataxia, a peculiar drunken-like gait; nystagmus (q.v.), adiadochokinesis, vertigo, hypotonus, asynergia, muscular asthenia, forced movements of the head and eyes, peculiar speech dysarthrias and occasionally cerebellar fits. Consult Jelliffe and White, 'Diseases of the Nervous System' (2d ed., 1917). See BRAIN.

CEREBRAL HÆMORRHAGE. See BRAIN, DISEASES OF.

CEREBRATION, an old term, much used in the early physiologies, designating an automatic reflex series of brain actions taking place below the threshold of consciousness (q.v.).

CEREBRIN, $C_{66}H_{130}N_2O_{18}$, a name that has been applied, at different times and by different chemists, to various substances that are obtainable from the brain and other parts of the nervous system by extraction with alcohol. It is now usually applied to a white, crystalline, nitrogenous powder that is obtained by heating ox-brain with baryta, washing, drying and finally extracting with alcohol. The cholesterin that is also present in the product so obtained may be removed by the action of ether, in which cerebrin is insoluble. Cerebrin does not combine with acids or bases, but by prolonged boiling with dilute acids it is converted into a monosaccharide galactose and the nitrogenous substance known as sphingosin that can reduce Fehling's solution.

CEREBROSPINAL, pertaining to the brain and spinal cord together, looked on as forming one nerve mass.

CEREBROSPINAL FLUID. See BRAIN.

CEREBROSPINAL MENINGITIS. See MENINGITIS.

CEREBRUM. See BRAIN.

CEREMONIAL, Court. See COURT CEREMONIAL.

CEREMONIALE, the book used in the Catholic Church containing the ceremonies and rites for all general religious functions. The term is restricted to the Ceremoniale Episcoporum (of the bishops) and Ceremoniale Romanum, special ceremonies and prayers being found in other books, such as Breviary, the Missal, etc. (qq.v.).

CEREOPSIS, sē-rę-ŏp'sĭs, the pigeon-goose, an Australian genus of the *Anatidæ* or duck family, and the subfamily *Anserinæ,* or geese. It has a small and extensively membranous bill and notably long legs, bare above the suffrago. They are so named from the remarkable size of their cere. There is but one species *C. novæ hollandiæ* which has been made the type of a subfamily *cereopsinæ.*

CERES, sē'rēz, the name given by the Romans to the Greek goddess of agriculture, Demeter, when her worship was introduced into Rome. The origin of the name cannot be explained with certainty. It is not Latin; but some think it was Etruscan, among which people, according to Servius, Ceres was one of the Penates. Others think that Ceres may be the same with the Greek Cora, or Core (that is,

"maiden"), another name for Persephone, the daughter of Demeter, with whom Demeter herself was often confounded. The worship of Demeter, or Ceres, was introduced into Rome from Sicily at the beginning of the 5th century B.C., and the first temple to her was vowed by the dictator, A. Postumius Albinus, 496 B.C. Her worship soon acquired a considerable degree of political importance. She was the goddess of the earth in its capacity of bringing forth fruits and grain. Her festival was the Cerealia. She is always represented as fully draped, with ears of corn and poppies in her hands and on her head a corn-measure. They sacrificed pigs and cows to her. As usual when the Romans introduced the worship of a foreign divinity into their own city, they adopted all the legends connected with that divinity, adapting them to their own mythology. Thus she was made the daughter of Saturn and Ops, and sister of Juno, Pluto, Neptune, Jupiter and Vesta. Her daughter was Proserpine (q.v.). See DEMETER.

CERES, the name of the first asteroid discovered between the orbits of Mars and Jupiter. It was discovered by Piazzi, 1 Jan. 1801. Having observed it at Palermo, in Sicily, he called it Ceres, after the old tutelary divinity of that island. Under favorable circumstances it has been seen by the naked eye as a star of the seventh magnitude, but more generally it looks like one of the eighth magnitude; some observers call the light reddish and perceive a haze about the planet. Its diameter is about 500 miles.

CEREUS, sē'rē-us, a genus of plants of the family *Cactaceæ,* remarkable for their singularity of form and the beauty of the flowers. *C. giganteus,* the suwarrow or saguaro of the Mexicans, is perhaps the largest and most striking of the genus. It rises to the height of 50 or 60 feet, and looks more like a candelabrum than a tree of the normal type. It occurs in Arizona and northwestern Mexico. Other notable species are *C. senilis,* the long gray bristles of which give it the appearance of the head of an old gray-haired man. *C. grandiflorus* is the night-flowering cereus, but there are others which also flower at night. *C. speciosus,* an erect plant, commonly cultivated in greenhouses, is a native of Mexico. *C. flagelliformis,* a creeper, is not unfrequently met with in gardens. The members of the genus are generally useful as cardiac agents and antipyretics. The fruits of many species are used for food.

CERIGNOLA, chā-rēn-yō'lā, Italy, town in the province of Foggia, and 24 miles southeast from the city of Foggia. It has a college, several convents and a hospital. The inhabitants manufacture linen; and the district produces large quantities of almonds, oil and cotton. In 1503 the Spaniards under Gonzales, Duke of Cordova, here defeated the French, when the Duc de Nemours, who commanded the latter, was slain. Pop. 38,180.

CERIGO, chā'rē-gō (ancient CYTHERA), Greece, an island in the Mediterranean, separated from the southern coast of the Morea by a narrow strait. It formerly belonged to the Ionian Republic of the Seven Islands, but in 1864 became part of the province of Arcadia, Greece; area, about 106 square miles. It is rather rocky and mountainous. Grain, wine, olives and other fruits are raised. Sheep and goats constitute the chief live stock. The people are of Greek origin, and are all of the Greek Church. At an early period a Phœnician colony was founded here. Later it was successively under the control of Argos, Sparta and Athens, and finally fell into the hands of the Romans. After submitting to Venice and then to Turkey, in 1718, it was once more assigned to Venice. It was annexed to France in 1807; two years later it was occupied by the English; after 1815 it shared the fate of the Ionian Islands. It was anciently sacred to Aphrodite (Venus), who was also called Cytherea. Pop. 13,100.

CERINTHUS, one of the first heresiarchs who, according to Saint Irenæus in his work, 'Against Heresies,' was contemporary with the evangelist Saint John; but Tertullian and Epiphanius refer him to the time of Hadrian. In Irenæus' work, as also in the 'Philosophumena,' attributed variously to Origen and Hippolytus, bishop of Ostia, Cerinthus is represented as an alumnus of the pagan philosophical schools of Alexandria; but he broached his heretical doctrines in Asia Minor, and there had a numerous following. The universe, he taught, is not the work of the First God, but was created by some angelic power far inferior to the supreme power. Jesus he held to be the son of Joseph and Mary, born as other men are born, but excelling all in righteousness, wisdom and understanding. Cerinthus taught also that upon Jesus, after his baptism of John, descended the Christos from the power which is supreme over all, in the form of a dove, and that then Jesus proclaimed the unknown Father and wrought miracles; but that at the end of the passion the Christos flew away out of Jesus, and Jesus suffered, but that the Christos remained impassible, being the spirit (or breath) of God. Angels play a conspicuous part in the system of Cerinthus. Thus it was an angel, he says, that gave the law to Moses; and the Yahve of Israel was an angel. Cerinthus and his followers entertained a special animosity against Saint Paul and Saint John, and the heresiarch is credited with writing an apocalyptic book in rivalry with Saint John. He is said to have been a believer in the millennial reign of the Christ upon the earth. Modern critics consider Cerinthus a Gnostic who, in common with the Jewish Ebionites, held the belief that the Christ was a thing apart, which was with Jesus only during his life and left him at death.

CERITE, sē'rīt, a mineral occurring only at Riddarhyttan, in Sweden, and containing the rare element cerium, and others of the cerium group. Its formula is not certainly known, but the mineral may be described as a silicate of the metals of the cerium group, combined with small quantities of calcium and iron. It is mostly massive or granular, but crystals belonging to the orthorhombic system are sometimes found. Cerite has a hardness of about 5.5, and a specific gravity of about 4.9. It has a peculiar and characteristic color, intermediate between clove-brown and cherry red shading off to a gray.

CERIUM, sē'rĭ-ŭm, a metallic element the oxide of which was discovered and recognized

as a new substance in 1803 by Klaproth, and, independently, by Berzelius and Hisinger. It was named for the minor planet Ceres, which was also discovered at about the same time. The principal source of cerium is the mineral monazite (q.v.), which is a silicate of cerium and certain other allied elements. Cerium forms a basic nitrate that is insoluble in water, and this fact affords a ready means of separating the metal from the other elements with which it is almost invariably associated. Metallic cerium may be obtained by electrolysis of the anhydrous chloride, or by melting the anhydrous chloride with metallic sodium. Thus prepared, cerium is a steel-gray metal, ductile and malleable, and melting at a temperature probably not far from the melting-point of silver. Its chemical symbol is Ce, and its atomic weight is 139.1 if H = 1. It has a specific gravity of from 6.6 to 6.75, and a specific heat of about 0.0448. It does not change in dry air, but in moist air it oxidizes superficially. It decomposes in cold water slowly, and in hot water quickly. Two oxides of the metal certainly exist, one having the formula Ce_2O_3 and the other the formula CeO_2. Three other oxides have also been described, with the formulæ CeO_3, Ce_2O_5 and Ce_4O_9; of these the first probably exists, but the other two still need confirmation. Oxide of cerium is also used in the manufacture of the better grades of incandescent gas-mantles. A fabric of cotton is woven of the desired form and this is impregnated by repeated dipping in a solution of the nitrates of cerium and thorium. On ignition the cotton burns away, and the nitrates are converted into oxides, which give the intense luminosity desired. A mixture of 99 per cent of thorium oxide to 1 of cerium oxide gives the best results.

In medicine the insoluble salts of cerium are used, cerium oxalate alone being officinal. It resembles the insoluble bismuth compounds in its action, being a sedative to mucous membranes, and it is much used as an antemetic, particularly in the nausea of pregnancy. The soluble salts of cerium are poison, their action being similar to the soluble salts of bismuth.

CERNUSCHI, Enrico, chĕr-noos'kē, Italian economist: b. Milan, Italy, 1821; d. Mentone, 12 May 1896. He was graduated at Pavia in 1842, fought for liberty in the insurrection of 1848 and was obliged to flee from Italy, owing to political proscription. He acquired a large fortune in Paris as a banker, but owing to the hostility of the communists left France in 1871 and traveled extensively in Egypt, China, Japan, England and the United States, visiting the last named in 1877. He brought back valuable ethnological and art collections which he bequeathed to the city of Paris. They now form the Musée Cernuschi, opened in 1898. He was an ardent bimetallist, and published 'Mécanique de l'échange' (1865); 'Illusions des sociétés co-operatives' (1886); 'Discours' (1871); 'Silver Vindicated' (1876); 'Le bi-metallisme à quinze et demi' (1881); 'Anatomie de la monnaie' (1886), etc.

CERO, sē'rō, a large, edible fish (*Scomberomorus regale*) of the western Atlantic, and similar to the Spanish mackerel. Another species (*S. caballa*), also called "sierra" or "king-cero" is found in the southern Atlantic, and reaches double the weight of the former, often attaining 100 pounds.

CERQUOZZI, chār-kwōt'zē, **Michelangelo,** Roman painter: b. Rome 1602; d. 1660. He received the surname *delle battaglie* (battle-painter), and at a later period that of *delle bambocciate,* because, in imitation of Peter Laar, he painted ludicrous scenes taken from low life, such as that to be seen at fairs and markets, and among the lazzaroni. Among his best works are the 'Insurrection of Masaniello in Naples' (Palazzo Spada, Rome); 'St. John the Baptist Preaching'; three Roman folk scenes (Galleria Nazionale, Rome) and two battle scenes (Dresden Gallery). Nearly all of the principal museums of Europe possess representative works by him.

CERRETTI, chĕr-rĕt'tē, **Luigi,** Italian poet and rhetorician: b. Modena, 1 Nov. 1738; d. Pavia, 5 March 1808. The purity and elegance of his diction made him, at an early age, the most distinguished professor of rhetoric and oratory in Italy. His 'Poems and Select Prose,' collected into a posthumous volume, were instantly successful, and have retained their rank ever since.

CERRO BLANCO, the highest mountain in New Mexico; summit, 14,269 feet.

CERRO GORDO, thĕr'rō gōr'dō, or sĕr' rō gôr'dō ("Big Hill"), a famous mountain pass in Mexico, the scene on 18 April 1847, of one of the sharpest battles of the Mexican War. After the capture of Vera Cruz on the coast, General Scott moved northwest toward the city of Mexico, along the National road. Some 50 miles from Vera Cruz this leaves the steaming lowlands and climbs a steep rocky plateau, an eastern spur of the great mountain range, seamed with ravines and thick with chaparral, and pierced by the defile of the little Rio del Plan. To this defile the road after crossing it and leaving it by a loop to the north among the mountains, returns at a ravine separating a sharp rocky ridge called Atalaya from a conical eminence termed Telegraph Hill. West of this again is the small hamlet called Cerro Gordo, which gives its name to the pass. On 9 April Santa Anna began fortifying Telegraph Hill, and from the 12th pushed on the work with all his force; accumulating about 12,000 men, the bulk at Cerro Gordo, but neglecting to occupy Atalaya. On the 11th, Scott's vanguard under Twiggs and Harney came up to Rio del Plan at the foot of the plateau, where the road crosses the river, drove away a few Mexican lancers, established a camp and began reconnoissances. Santa Anna, in place of attacking the scattered detachments, confided in his strong position, and the lowland fevers which must force the Americans to fight him, and waited. By the 17th most of Scott's forces had come up; and he pushed Twiggs forward within easy striking distance. The latter, finding Atalaya undefended, occupied it just as a Mexican detachment advanced to do so, routed them and chased them in headlong flight half way up Telegraph Hill. The whole American army, about 8,500, being now at hand, Scott issued orders for a general advance next day. Santa Anna's line extended from Telegraph Hill to a road at the ravine, and eastward for a mile along the heights overlooking

the National road, which ends in a precipitous rocky bluff 100 feet high; then back over three ridges terminating in rocky knolls, to the river defile. In front of the batteries and infantry, the chaparral had been cut down and piled into an abattis for several hundred feet. The Americans, on the other hand, planted powerful batteries on Atalaya, and enfiladed the Mexican right with a howitzer across the river. Scott's plan was simple, but brilliantly effective, though the impassable ground made it fall short of the full intention. Since the Mexicans expected the chief attack on their right, he resolved to make only a feint there and assuming that they expected him to move forward along the road resolved not to do so. In the meantime he ordered the roads cleared around the hills to the north in order that by making a circuit to the National road in the rear of the Mexicans he might cut off their retreat. On the morning of the 18th Pillow assailed the right; the artillery on Atalaya rained shot and shell with terrific effect on Telegraph Hill, the road batteries, Santa Anna's camp, and even his reserves, and the howitzer over the river added its discharge. Twiggs, Shields and Worth, with Riley, then moved along the circuit till on the north flank of Telegraph Hill, at first out of sight, then in full range of the Mexican fire. Santa Anna detached part of the forces on Telegraph Hill to drive them back; then Harney from Atalaya swept over the crest and down the side, up Telegraph Hill till within 200 feet of the batteries and below their range. There he reformed and in one final charge utterly routed the Mexicans, at the same time turning the forces on the hill against the main body of Mexicans at Cerro Gordo. The entire right, its retreat cut off, threw down its arms and surrendered. The main body broke up in a panic, as the fugitives from Telegraph Hill rushed among them and the guns from that quarter cut them down, and fled wildly down the craggy slopes and to the defile, and westward along the road. The Mexicans lost 1,000 or 1,200 in killed and wounded; about 3,000 prisoners, including 5 generals, and 299 other officers; 43 guns and 3,500 small arms. The Americans lost 63 killed and 368 wounded. The victory laid open the road nearly to the Mexican capital. Consult Bancroft, 'History of Mexico' (Vol. V, San Francisco 1885); Wright, 'General Scott' (New York 1894); and Wilcox, C. M., 'History of the Mexican War' (Washington 1892).

CERRO LARGO, sĕr'rō lär'gō, a department in the northeast of Uruguay, well watered, with large savannahs and forests. Area, 5,729 square miles. Capital, Cerro Largo or Melo. The inhabitants are chiefly engaged in cattle-raising. Pop. 36,000.

CERRO DE PASCO, sĕr'rō dā päs'kō, Peru, capital city of the department of Junin, at the northern extremity of the plateau of Bourbon, 14,275 feet above the level of the sea at the north end of Lake Chinchaycocha. The town came into existence in 1630, in consequence of the discovery of veins of silver there by an Indian. The streets are narrow and crooked, and the houses small and without windows or balconies. The inhabitants are a mixture of all races and nations, who make their living by the produce of the mines. From October to July hail-storms, mists and snow-falls make the place almost intolerable, and in summer with the exception of a few clear days the climate is little better. On account of the extreme rarity of the air the difference in temperature in the sun and in the shade is great. Cerro de Pasco still contains the most productive mines in all Peru, although they no longer yield the almost fabulous wealth that the Spaniards are said to have derived from them. Many of the shafts leading down to the veins of silver are in the town itself, and have their openings either in little huts or in the dwellings of the owners of the mines. According to the greater or smaller depth of the diggings they are called *minas* or *cortes*. The silver is found partly pure, and partly in ores containing from 25 to 80 per cent of the precious metal. Pop. (very variable) about 14,000.

CERROS, or **CEDROS, ISLAND,** an island belonging to Mexico, in the Pacific Ocean, off the west coast of Lower California where it forms a part of the western boundary of San Sebastián Viscaino Bay. It lies between lat. 28° 5′ and 28° 35′ N. The climate is dry. It is for the most part mountainous and barren, but is thought to possess mineral wealth. Area, 12 square miles.

CERTALDO, Italy, town of Tuscany, partly on a conical height, and partly on a flat along the right bank of the Elsa, 15 miles southwest from Florence. It is the birthplace, was long the home and now contains the ashes of Boccaccio. His house is still shown, and in one of its rooms are collected numerous relics of the author of the 'Decameron,' and a large fresco painting of him by Benvenuti of Florence. Pop. 10,439.

CERTIFICATE OF INCORPORATION. See CORPORATIONS, LEGAL.

CERTIFICATION OF TEACHERS. See SCHOOL SUPERVISION; also TEACHERS, PROFESSIONAL TRAINING OF. For foreign systems see the subheads *Education*, under the articles on the various countries.

CERTIORARI, sĕr-shē-ō-rär'ī, in law, a writ issuing from a superior court to call up the record of a proceeding in an inferior court, or before a body or officer exercising judicial power, that it may be tried or reviewed in the superior court. This writ is usually obtained on complaint of a party that he has not received justice, or that he cannot have an impartial trial in the inferior court or body. It is now to a great extent superseded by the appeal.

CERULEUM, a blue pigment, consisting of stannate of protoxide of cobalt mixed with stannic acid and sulphate of lime.

CERULLI, chĕ-rool'li, **Vincenzo,** Italian astronomer: b. Teramo, Italy, 20 April 1859. He was educated at the Sapienza, Rome, and at the University of Berlin. For some time he was astronomer of the Gregorian University, Rome. In 1892 he founded the Collurania Observatory at Teramo of which he has since remained director. He discovered the planet (704) Interamnia, and rediscovered the Faye comet in 1910. He is corresponding member of the Lincei Academy, the Pontaniana Academy, Naples, the Turin Academy of Sciences and of

the Italian Astronomical Society. He is the author of two works on Mars; three volumes of publications of the Collurania Observatory and is a contributor to *Astronomische Nachrichten;* 'Memorie Spettroscopisti Italiani,' and 'Astronomia e scienza affini.'

CERUMINOUS GLANDS, the glands of the ear which secrete the cerumen or wax which lubricates the passage to the tympanum and prevents the entrance of foreign matter.

CERUSITE, the native lead carbonate, $PbCO_3$. It is common in orthorhombic crystals, very frequently stellately twinned. It also abounds in massive, earthy and stalactitic forms. It is very brittle, has a hardness of 3 to 3.5 and the high specific gravity of 6.5. It is usually translucent and of an adamantine or pearly lustre. Its color is white or gray, though green and yellow tints are not uncommon. It is one of the most abundant and valuable ores of lead, and often carries silver. It is formed from galena by the action of solutions of calcium bicarbonate. Among its many important localities are Broken Hill in New South Wales, Ems in Germany and Phœnixville, Pa.

CERUTTI, chă-roo'tē, **Giuseppe Antonio Gioachimo,** French Jesuit theologian: b. Turin, 13 June 1738; d. Paris, February 1792. He was one of the most eminent professors in the Jesuit College at Lyons and his 'Apologie générale de l'institut et de la doctrine des Jesuites' attracted much attention. He had already published two discourses upon the means of preventing duels, and on the reasons why modern republics have not reached the splendor of the ancient. The last received the prize of the Academy of Dijon. He was at Paris when the Revolution broke out in 1789. Abandoning his former principles he became one of the most zealous supporters of the new order of things. He was intimately connected with Mirabeau, and labored much for him. He also published with two others a paper called '*La Feuille villageoise*' for the purpose of keeping villagers informed of the news of the day, and several pamphlets, among which was a 'Mémoire sur la nécessité des contributions patriotiques.' In 1791 he was a member of the legislative assembly. Some time after he delivered, in the church of Saint Eustache, a funeral discourse upon Mirabeau. The city of Paris called a street after his name. His collected works were published in 1793 (3 vols.). Consult Aulard, F. A., 'Un pamphlet de Cerutti, dans la Revolution française, revue historique' (Vol. XV, p. 55).

CERVALCES, an extinct, moose-like deer, complete skeletons of which have been found in Pleistocene marls in New Jersey, and which probably survived until the advent of human hunters. Its antlers are less broadly palmated than those of the existing moose, but have great trumpet-shaped plates on the lower prongs; the legs are very long, and the feet spread like those of a caribou, suggesting that it traveled in a snowy region, and indicating a much colder Quaternary climate in New Jersey than at present. The neck is too short to enable the animal to reach the ground without kneeling, and it is inferred that it was altogether a browser, although it has not the long prehensile muzzle of the elk or moose. It is, indeed, an intermediate form between stag and moose. Consult Osborn, 'Age of Mammals' (New York 1910).

CERVANTES, Philippines, capital of the province of Lepanto, situated near the centre of the province in the northwestern part of the island of Luzon, three miles from Cayán, the former capital. It is on a road connecting it with Benguet, and is 78 miles from Dagupan, which is the nearest point on the railroad. Pop. 16,000.

CERVANTES SAAVEDRA, thăr-văn'tĕs sä-ä-vä-drä, **Miguel de,** Spanish poet and novelist, one of the great writers of modern times: b. Alcalá de Henares, 9 Oct. 1547; d. Madrid, 23 April 1616. His parents removed to Madrid when he was about seven years old. Their limited means made it desirable that he should fix on some professional study, but he followed his irresistible inclination to poetry, which his teacher, Juan Lopez, encouraged. Elegies, ballads, sonnets and a pastoral, 'Filena,' were the first productions of his poetical genius. Poverty compelled him to quit his country at the age of 22, to seek maintenance elsewhere; he went to Italy, where he became page to the Cardinal Giulio Acquaviva, in Rome. In 1570 he served under the papal commander, Marco Antonio Colonna, in the war against the Turks and African corsairs, with distinguished courage. In the battle of Lepanto, in 1571, he lost his left hand. After this he joined the troops at Naples, in the service of the Spanish king. In 1575, while returning to his country, he was taken by the corsair Arnaut Mami, and sold in Algiers as a slave. He remained in slavery for seven years, but servitude, far from subduing his mind, served to strengthen his faculties. Vincente de los Rios and M. F. Navarrete, his chief biographers, relate the bold but unsuccessful plans which he formed to obtain his freedom. In 1580 his friends and relations at length ransomed him. At the beginning of the following year he arrived in Spain, and from this time lived in seclusion, entirely devoted to the muses. It was natural to expect something uncommon from a man who, with inexhaustible invention, great richness of imagination, keen wit, and a happy humor, united a mature, penetrating and clear intellect, and great knowledge of real life and mankind in general. But it rarely happens that expectation is so much surpassed as was the case with Cervantes. He began his new poetical career with the pastoral novel 'Galatea' (1584), in which he celebrated his mistress. Soon after the publication of this he married. Being thus obliged to look out for more lucrative labor he employed his poetical genius for the stage; and in the course of 10 years furnished about 30 dramas, among which his tragedy called 'Numancia' is particularly valued. He was not so successful in another kind of drama particularly favored by the Spaniards, a tangled mixture of intrigues and adventures; and this was doubtless the cause of his being supplanted by Lope de Vega, who was particularly qualified for this kind of composition. He consequently gave up the theatre, but it seems not without regret. From 1588 to 1599 he lived retired at Seville, where he held a small office.

He did not appear again as an author till 1605, when he produced the first portion of that work which has immortalized his name,— 'Don Quixote.' Cervantes had in view by his work to reform the taste and opinions of his countrymen. He wished to ridicule that adventurous heroism with all its evil consequences, the source of which was the innumerable novels on knight-errantry. The beginning of the work was at first coldly received, but soon met with the greatest applause, in which at a later period the whole of Europe joined. Cervantes' true poetical genius was nowhere so powerfully displayed as in his 'Don Quixote,' which, notwithstanding its prosaic purpose and its satirical aim, is full of genuine poetry. While it struggles against the prevailing false romance of the time, it displays the most truly romantic spirit. The extraordinary good fortune of the work did not extend to the author. All his attempts to better his condition were unsuccessful, and he lived contented with his genius and his poverty, and a modest though proud estimation of his merits. After an interval of some years, he again appeared before the public in 1613, with 'Twelve Novels' (which may be placed by the side of Boccaccio's), and in 1614 his 'Journey to Parnassus' — an attempt to improve the taste of his nation. In 1615 he published eight new dramas, with intermezzos, which, however, were indifferently received. Envy and ill-will, in the meantime, assailed him, and endeavored to deprive the neglected author of his literary fame; for which the delay of the continuation of 'Don Quixote' afforded the pretext. An unknown writer published, under the name of Alonzo Fernandez de Avellaneda, a continuation of this work, full of abuse of Cervantes. He felt the malice of the act painfully, but revenged himself in a noble manner by producing the continuation of his 'Don Quixote' (1615), the last of his works which appeared during his lifetime; for his novel 'Persiles and Sigismunda' was published after his death. He found a faithful friend in the Count of Lemos, but poverty, his constant companion through life, remained true to him till his last moments. He died on the same day as Shakespeare, in Madrid, where he had resided during the last years of his life, and the tercentenary anniversary of his death was celebrated in many European and American literary centres, contemporaneously with the Shakesperian tercentenary celebration in 1916. He was buried without any ceremony, and not even a common tombstone marks the spot where he rests. In addition to his celebrity as an author, he left the reputation of a man of a firm and noble character, clear-sighted to his own faults and those of others. (See DON QUIXOTE; EXEMPLARY NOVELS). Among the best early editions of 'Don Quixote' are the one published at Madrid by Joaquin Ibarra in 1780, considered a masterpiece of typography; that of Pellicer (Madrid 1798), and that of D. Diego Clemencin, with an excellent commentary (Madrid 1833–39). Many of his works are translated; 'Don Quixote' into all the languages of Europe. Among early English translations may be mentioned those of Motteux (1719); Jarvis (1742); and Smollett (1755). A more recent notable translation is that of Ormsby, J. (1885), containing life of the author, notes, bibliography, etc., republished with critical introduction by Fitzmaurice-Kelly, J. (Glasgow 1901).

CERVANTITE, or **ANTIMONY OCHER,** is native antimony tetroxide, Sb_2O_4. It usually occurs in crusting stibnite and other antimony ores. It has a pale yellow color and greasy lustre.

CERVERA Y TOPETE, Pascual, thăr-bā'rā ē tō-pā'tā, Spanish naval officer: b. province of Jerez, 18 Feb. 1833; d. Puerto Real, Spain, 3 April 1909. He was of noble birth on his mother's side. He was graduated at the Naval Academy of San Fernando; entered on active service in 1851; served against Morocco and was made first lieutenant in 1859; captain in 1868; and admiral subsequently. He was a prominent factor in the 10-years' war in Cuba, when he succeeded in blockading the ports and preventing the landing of filibusters; was sent to London as a representative of Spain to take part with other nations in a conference bearing on naval questions of international importance; and commanded the fleet sent against the American squadron operating in Cuban waters after the declaration of war in 1898. He took refuge in the inner harbor of Santiago de Cuba, and when, on 3 July, he attempted to escape, under imperative orders from his superiors, his entire fleet was destroyed by the squadron under the official command of Rear-Admiral Sampson and the actual command (in the temporary absence of that officer) of Rear-Admiral Schley. Admiral Cervera and his surviving officers were sent to Annapolis, Md., as prisoners of war, and soon afterward were released and allowed to return to Spain. He was a man of cultured and genial manners, of a kindly disposition and was a gallant officer and received many official courtesies at the hands of his captors. Consult 'Spanish American War' (trans. from the Spanish, Washington 1899) and Cervera y Topete, 'Views Regarding the Spanish Navy in the Late War' (Washington 1898); Alger, R. A., 'The Spanish American War.'

CERVIDÆ, sĕr'vĭ-dē, the deer family, a group of ruminant ungulates, including, besides the typical deer, the reindeer, the musk-deer and others. The most noticeable characteristic of the entire group is the presence, in the males, or "bucks," of branched appendages to the skull, called antlers. These are, however, lacking in certain species, which, despite this fact, are very evidently closely related to the antlered deer. Only among the reindeer do the females have antlers. The antlered animals shed these ornaments annually and develop new ones. (For growth and reproduction of these, see ANTLERS). Other peculiarities of the family are anatomical; the most noticeable is the absence (except in *Moschus*) of a gall-bladder, and the presence in all of two lachrymal ducts, one visible outside the eye in the "tear-bag" (*Crumen*). The subfamily *Cervinæ,* with several genera and about 60 species, embraces the typical deer; the subfamily *Moschinæ* includes only the musk-deer (q.v.), separated because it is hornless, retains the gall-bladder and has no crumen. The musk-deer is confined to the Himalayan region. Otherwise deer occur in all parts of the world except Australia and Africa. Indications of kinship to his race occur in the

fossil *Leptomeryx* of the Oligocene, but the oldest certain types are of Miocene Age, and were small creatures somewhat akin to the modern muntjacs, but totally hornless. "Not until the middle of the Miocene has a deer (*Dicrocerus*) been found with horns, and they are bifid, and stand upon a long pedicel — also muntjac-like. Later came true deer with branching horns which culminated in a European species with twelve points on each antler — the celebrated 'giant stag' of the Irish peat bogs and similar places, whose palmated antlers spread 10 to 12 feet from tip to tip; it was, in fact, a huge fallow deer." (See DEER). Consult Flower and Lydekker, 'Mammals' (London 1891).

CERVIN, Mont (German, *Matterhorn;* Italian, *Monte Silvio*), a mountain, Switzerland, Pennine Alps, on the southern frontiers of canton Valais, about six miles west-southwest of Zermatt, from which a road leads to the Col Saint Théodule, a pass over the mountain into Piedmont. It is one of the most magnificent objects in nature, being an almost inaccessible obelisk of rock starting up from an immense glacier, to a height scarcely 1,000 feet lower than that of Mont Blanc. The glacier, which differs from the lower glaciers in not being included between bold walls, but occupying a vast and desolate table-land, is nearly 10,000 feet above sea-level. The height of the peak is 14,837 feet. It is composed of feldspar slate or gneiss. The peak was first ascended by a party of four English travelers and three guides in July 1865, but three of the party and a guide perished in the descent. (Consult Whymper's 'Scrambles Among the Alps'). On the summit of the pass, 11,096 feet, are the remains of a rude fortification, supposed to have been erected two or three centuries ago, to prevent incursions from the Valais. The LITTLE MATTERHORN, or PETIT MONT CERVIN, reaches a height of 12,750 feet in the same group of mountains and is easily reached from the Théodule Pass.

CERVOLLE, sĕr-vŏl, or **CERVOLE, Armande de,** French bandit chief, surnamed "The High Priest." He was taken prisoner with King John at the battle of Poitiers in 1356, and after being ransomed, plundered the south of France with a band of troopers (*routiers*), and exacted tribute from Innocent VI at Avignon. He served for a time under the Dauphin; pillaged Burgundy, Champagne, Alsace and Lorraine; was made chamberlain to Charles V in 1365; and was murdered in 1366.

CESALPINO, chā-zäl-pē'nō, or **CÆSALPIN, Andrea,** Italian botanist and physiologist: b. Arezzo, Tuscany, 1519; d. Rome, 23 Feb. 1603. He studied and taught medicine and botany at the University of Pisa, and was physician to Pope Clement VIII. He was the author of a valuable work 'On Plants,' in which he classified plants by their parts of fructification. To this work Linnæus, Jussieu and other subsequent botanists were greatly indebted for their ideas of botanical classification. In his 'Peripatetic Investigations' he propounded the theory of the circulation of the blood, afterward adopted and demonstrated by Harvey.

CÉSAR BIROTTEAU, bĭ-rô'tō (1837), is perhaps the most notable in a noteworthy group of scenes in Balzac's 'Human Comedy' dealing with business venture and the chicanery of unscrupulous finance, with the cumulative entanglements of debt and the legal snares of usurious oppression. In this novel these are viewed from the point of view of a prosperous tradesman, with chivalrous standards of commercial honor, whom success in his own field betrays into ventures in unfamiliar regions where he falls among thieves, men whom he thought he had special reason to trust. It is, Balzac says in his preface, "the obverse of a medal whose reverse is La Maison Nucingen," which deals, somewhat less genially, with the same theme from the side of the exploiters of men of too credulous probity. César, a brother of Balzac's memorably unfortunate Curé de Tours, had prospered as a manufacturing perfumer during the consulate and the empire, though his relations to militant royalists had brought him a wound in connection with the conspiracy of Vendémiaire, 1795, which seemed to give him a title to the aid of royalist sympathizers after the Restoration. One of these was the very unscrupulous and successful Baron Nucingen. Du Tillet, once Birotteau's head-clerk and a betrayer of both his domestic and his mercantile confidence, but now a financial shark and confederate of Nucingen for his baser needs, interests Birotteau, at a moment when his ambition reaches full bloom in a nomination as chevalier of the Legion of Honor, in a speculation and in imprudent expenditure by which his wealth becomes theirs and he a bankrupt debtor. By heroic exertion, four years' persistent labor and scrupulous economy, aided by Popinot, another type of industrial honor, who was later to marry Birotteau's worthy and charming daughter Césarine, the debtor discharges his liabilities to the last farthing, dying from the relaxing of the strain immediately after his solemn rehabilitation and the restoration of his commercial honor and coveted decoration by the courts. The story is less to be commended as a whole than for its portrayals of character, especially of the two druggists, the generous and loyal Popinot and the smug materialist Matifat, of the gentleman-scoundrel Du Tillet and the ingenuously gracious Césarine, and most of all for its minute pictures, drawn it may well be from Balzac's own frequent memories, of the mental and moral tortures of César in his cumulating commercial embarrassments. There are four English translations.

BENJAMIN W. WELLS.

CESARESCO, Countess Martinengo. See MARTINENGO-CESARESCO, COUNTESS.

CESARI, chā-zä-rē, **Giuseppi** (sometimes called IL CAVALIERE D'ARPINO), Italian painter: b. Arpino about 1568; d. Rome, 3 July 1640. His first commission came from Gregory XIII who appointed him one of the group who were employed in the decoration of the Vatican. Among them was Roucalli, whose association profoundly influenced the younger artist. Five popes honored him. In style, he was one of the later 'Mannerists.' Among his best works are the frescoes of the Olgisti Chapel in Santa Prassede (1591); the huge 'Ascension' at Saint John Lateran; frescoes in the Borghese chapel and the capitol. A number of his smaller pictures may be found in the various European galleries.

Pope Clement VIII created him Cavaliere de Cristo. His works — in fresco and oil — display lively imagination, and great vigor in execution, although the broadness of his treatment has often been subjected to severe criticism by the more formal stylists of later periods.

CESAROTTI, chā-zä-rōt'tē, **Melchiore,** Italian poet and scholar: b. Padua, 15 May 1730; d. Solvaggiano, 3 Nov. 1808. He devoted himself to the *belles-lettres,* and was soon chosen professor of rhetoric in the seminary in which he was educated. He translated three tragedies of Voltaire,— 'Sémiramis,' 'La Mort de César' and 'Mahomet.' In 1762 he went to Venice, where he translated Ossian into Italian, and was, in 1768, appointed professor of the Greek and Hebrew languages in the University of Padua. Here he published his translation of Demosthenes and of Homer, and his course of Greek literature. After the establishment of the republican government, in 1797, he was appointed by the existing authorities to write an 'Essay on Studies.' In this he made suggestions for the improvement of education. In 1807 appeared his poem called 'Pronea' (Providence), in praise of his benefactor, Napoleon, who made him the same year knight of the Iron Crown. In spite of his advanced age he subsequently occupied himself with an edition of all his works; but his death prevented the completion of this enterprise. The edition of his works that had been begun during his life was completed by his friend Giuseppe Barbieri (1805–13). Consult Bersezio, Vittoria, 'Il regno di Vittorio Emanuele' (Turin 1878–81); and the memoir in the edition by Barbieri.

CESENA, chā-zā'nä, Italy, city in the province of Forli, central Italy, on the right bank of the Savio, 52 miles southeast of Bologna. Among its buildings are a library founded in 1452 by Domenico Malatesta Novello, which possesses 4,000 precious manuscripts; a Capuchin church containing one of the best of Guercino's paintings, a lyceum, gymnasium, technical school, seminary and a noble cathedral. Productive sulphur mines are in the neighborhood; and the region has been noted ever since Roman times for the excellence of its wine. Hemp, vegetables and silk form considerable items of trade. Cesena was the birthplace of Popes Pius VI and VII. There is a colossal statue of the former in the handsome city hall. In 1357, under Maria Ordelaffi, it made a famous defense against Albornoz; but in 1377 it was barbarously pillaged by Robert of Genf. Later it was taken by Cesare Borgia and became part of the papal dominions. On 30 March 1815, Murat gained a victory at this place over the Austrians. Pop. (1911) 46,445.

CESIUM. See CÆSIUM.

CESNOLA, chĕs-nō'lä, **Luigi Palma di,** American archæologist: b. Piedmont, Italy, 29 June 1832; d. New York, 22 Nov. 1904. He was educated at the Royal Military Academy and served in the Sardinian army during the war in 1849, and also in the Crimean War. He came to the United States in 1860, serving in the Civil War, and attaining the rank of brigadier-general. He was United States consul at Cyprus (1865–77), where he made extensive archæological discoveries. In 1878 he became a trustee and director of the Metropolitan Museum of Art, in New York, a post he held till his death. In 1897 he was awarded a Congressional medal of honor for conspicuous military service. Columbia University conferred on him the degree of LL.D. in 1880. He published 'Cyrus: Its Cities, Tombs and Temples,' and many monographs on art topics.

CESPEDES, thĕs'pā-dĕs, **Pablo de,** Spanish painter, sculptor, architect and poet: b. Cordova 1538; d. there, 26 July 1608. In 1556 he entered the University of Alcalá de Henares, where he distinguished himself by his proficiency in the classics and Oriental languages. He also assiduously cultivated his genius for the fine arts. Having at last made these his principal pursuit, he proceeded to Rome, studied under Zucchero and Michelangelo, and soon became renowned both for his frescoes and sculptures. In 1577 he obtained a prebend in the cathedral of Cordova, and from that time resided alternately in his native town and in Seville. His best pictures are in Cordova, Seville, Madrid and several towns of Andalusia; and are admired particularly for elegance and loftiness of design, complete knowledge of anatomy, the skilful employment of light and shade, warmth of coloring, accuracy of expression and spirituality of composition. One of his most celebrated pictures is a 'Lord's Supper,' in Cordova Cathedral. He was the head of the Andalusian school of painting, and numbered among his pupils some painters of distinction. The portrait by himself hangs in the old Spanish gallery at the Louvre. Consult Pacheco, 'Arte de la Pintura' (Seville 1649); Tubino, 'Pablo de Céspedes' (Madrid 1860); Viardot, L., 'Histoire des peintures.'

CESPEDES Y BORGES, bôr' gās, **Carlos Manuel de,** Cuban insurgent: b. Bayamo, 18 April 1819; d. 22 March 1874. He studied at the University of Havana, and later at Barcelona, Spain. Implicated in Prim's conspiracy, he was banished from Spain (1843), and returned to Cuba to practise law. As leader of the revolt of 1868, he was chosen by the insurgents president of the newly-proclaimed republic. He was killed in a skirmish with the Spaniards.

CESSART, cĕs-sär, **Louis Alexandre de,** French engineer: b. Paris 1719; d. 1806. He early entered the military service, and distinguished himself in the campaigns of 1743–46, during which he was present at the battles of Fontenoy and Rocoux. Bad health having obliged him to obtain his discharge, he entered the École des Ponts et Chaussées, where he displayed so much genius and industry that in 1751 he was appointed general engineer of Tours. In 1775 he was removed to Rouen, and in 1781 proposed his plans for the construction of the harbor and works of Cherbourg. These have immortalized his name. He died while engaged in preparing a description of his most important labors. The work was published under the title of 'Description des Travaux Hydrauliques de L. A. Cessart' (1806–09).

CESSIO BONORUM, sĕsh'ĭ-ō bō-nō'rŭm ("surrender of goods"), a process by which, according to the law of Scotland, a debtor against whom a warrant of imprisonment was issued, after being charged to pay his debt, was entitled to be free from imprisonment, if innocent of fraud, on surrendering his whole estate to his creditors. This procedure avoided infamy, and

the debtor could not be deprived of the bare necessities of life. Since the abolition of imprisonment for debt a debtor may be compelled to make *cessio bonorum* at the instance of a creditor. Any property accumulated after this surrender is liable to attachment so long as the debt is not wholly paid off.

CESTIUS, the name of a plebeian gens at Rome, of which two memorials have been preserved, one of them a bridge connecting the island of the Tiber with the right bank of that river, and the other a monumental pyramid standing at the gate San Paolo, partly within and partly without the walls of Aurelian. This pyramid stands upon a base of travertine. It is 125 feet high, and at the base 95 feet broad. It is built of bricks, encased in blocks of marble. In its interior there is a sepulchral vault 20 feet long, 13 feet broad and 14 feet high. The walls of this vault were formerly decorated with paintings, but these are now faded, and only a few traces of them are still discernible. They were copied in bronze by Falconieri 1661. Two marble pillars which formerly supported the statue of the person whom the monument commemorates stand in front of the pyramid. From the inscriptions still seen upon it, it has been inferred that the Cestius who caused this magnificent monument to be erected was a Roman knight of that name who lived in the time of Cicero, and who, having enriched himself in Asia Minor, left part of his wealth for the purpose of perpetuating his memory in this way.

CESTODA, or tapeworms, a class of the phylum *Plathelminthes.* Elongate ribbon-like usually jointed body with a scolex bearing suckers, hooks and other organs of attachment. The segments or proglottids contain complete sets of reproductive organs and after separation from the chain may lead an independent existence for some time. No trace of an alimentary system has been found and the nervous system is highly degenerate. The reproductive system is richly differentiated and produces large numbers of minute eggs which yield characteristic minute six-hooked embryos that develop in another host into bladderworms (*cysticerci*). After transfer to the first (primary) host the cysticercus grows into a chain.

Cestodes are parasitic in the various types of vertebrates only, though some bladderworm stages occur in worms, crustacea and insects of various sorts. In the rare monozoic cestodes (*Cestodaria*) the simple body contains only a single set of sex organs; in the polyzoic cestodes there are many such sets corresponding usually to the numerous segments. The latter group contains five orders, *Pseudophyllidæ, Tetraphyllidæ, Diphyllidæ, Trypanorhyncha* and *Cyclophyllidæ.* The fish tapeworm of man falls in the first order and all others from the human host in the last.

CESTRACION, sĕs-trā'sĭ-ŏn, a genus of primitive sharks, also known as *Heterodontus,* of which the best known species is the Port Jackson shark of Australia (*C. philippi*). Four species are known, varying in length from four to five feet. They feed mainly on various kinds of mollusks. The family *Cestraciontidæ,* though now represented by a single genus of four species, was very abundant in the earlier geological periods.

CESTUI, sĕs'-twi, **CESTUY,** in law, that person: common in the phrases *cestui que trust,* or person holding equitable title to an estate; *cestui que use,* or person in whose behalf another holds the fee of lands or tenements; *cestui que vie,* or person whose death terminates an estate. A *cestui que trust* holds only the equitable, never the legal title to an estate. The terms *cestui que trust* and *cestui que use* are almost identical in meaning, the former being more modern. As life estates are still common in Great Britain and the United States, the term *cestui que vie* is of considerable importance in the law of real property. An estate may be granted to one for his own life, for the life of another or for the lives of several others.

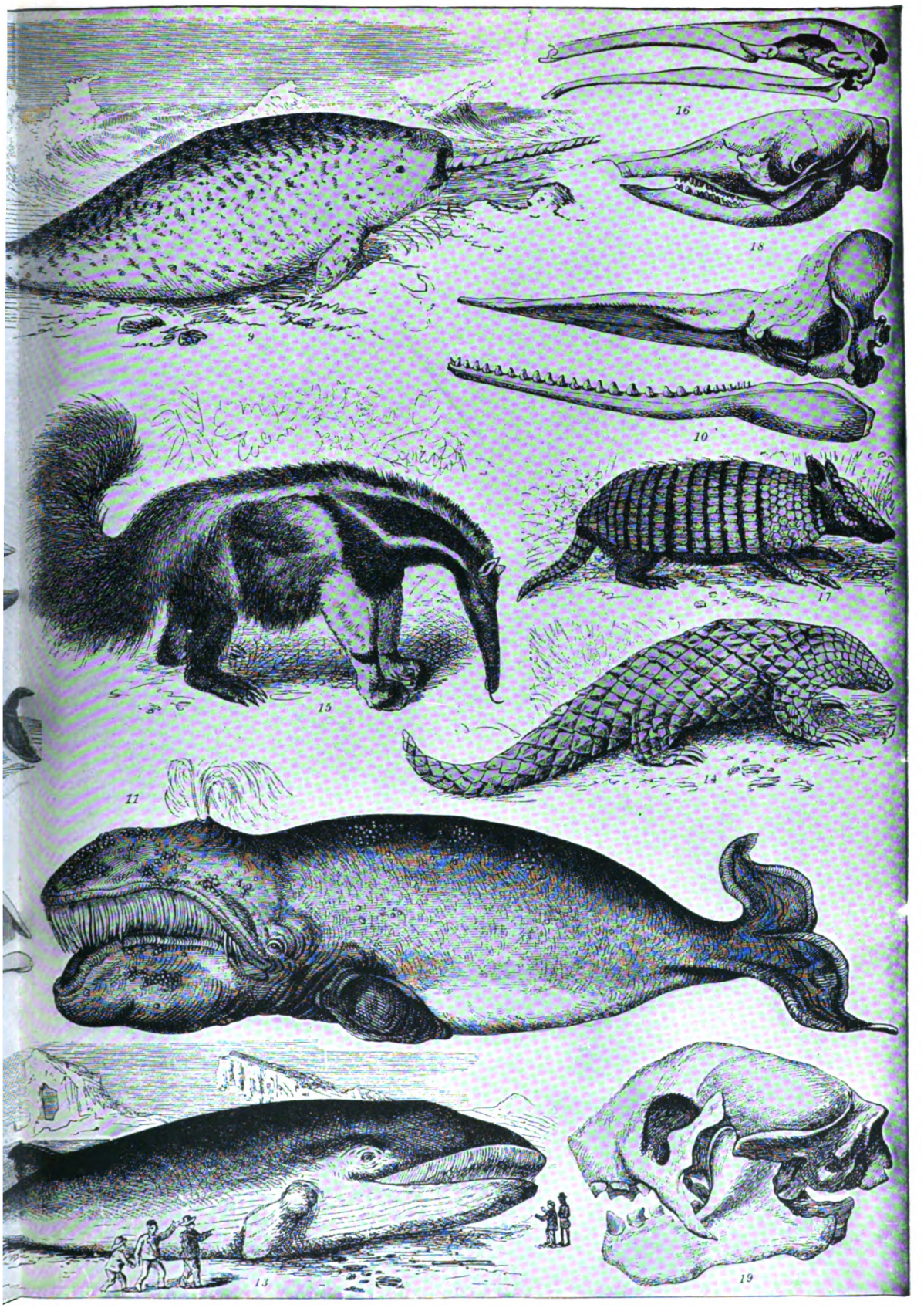
CESTUS (Lat. girdle), a band or zone said to have been worn by Aphrodite or Venus, and endowed with the power of exciting love toward the wearer. The following is Pope's translation of Homer's description of it:

> In it was every art and every charm
> To win the wisest, and the coldest warm—
> Fond love, the gentle vow, the gay desire,
> The kind deceit, the still-reviving fire,
> Persuasive speech, and more persuasive sighs,
> Silence that spoke, and eloquence of eyes.

CESTUS, or **CÆSTUS,** the boxing-glove of the Grecian and Roman pugilists. It consisted of thongs or bands of raw hide or leather, fastened to the hand and reaching to the wrist. It was afterward enlarged so as to reach up to the elbow, and loaded with metal to increase the weight of the blow. The combat with the ordinary unloaded cestus was not more dangerous than a common modern boxing-match. Theocritus (Idyll, xxii) and Virgil (Æneid, v. 362) describe one of these combats.

CETACEA, sē-tā'sę-ā, an order of mammals whose structure is so modified as to render them fit for an aquatic life. The whalebone whales, the toothed whales, as the porpoise, narwhal, etc., and the extinct zeuglodon, represent the leading divisions of the group. The body is fish-like in form, the head passing gradually into the trunk which tapers posteriorly and ends in a bilobate caudal fin which is placed horizontally, not as in the fishes, vertically. The posterior limbs are wanting, and the anterior are converted into broad paddles or flippers, consisting of a continuous sheath of the thick integument, within which are present representatives of all the bones usually found in the fore limb of mammals, but they are not movably articulated, so that the paddle moves like a solid oar. The fish-like aspect is further increased by the presence of a dorsal fin; but this is a simple fold of integument, and does not contain, as in fishes, any bony spines. The vertebræ of the neck, seven in number, are united more or less to each other, so that in some they form a single solid piece. The right whale and its allies have no teeth in the adult state, their place being taken by the triangular plates of baleen or whalebone which are developed on transverse ridges of the palate. The frayed edges of these plates slope obliquely downward and outward from the middle of the roof of the mouth, so that when the mouth is shut there is a triangular space in the middle, the floor of which is formed by the enormous

Fig. 1 Skull of Camel 2 Llama 3 Giraffe 4 Skull of Giraffe 5 Manatee 6 Skull of Dugong 7 Do
12 Skull of Greenland or Right Whale 13 Finner Whale 14 Short-tailed Manis 15 Ant-eater



Dolphin 8 Skull of Dolphin 9 Narwhal 10 Skull of Sperm Whale or Cachalot 11 Greenland or Right Whale
16 Skull of Ant-eater 17 Common Armadillo 18 Skull of Common Armadillo 19 Skull of Sloth

tongue. The water taken into the mouth is sifted by the frayed edges of the plates; it is driven out sideways between the plates and the tongue sweeps backward to the gullet any animals that have been caught in the fringes. But the fetal whales possess minute teeth, which are very soon lost. The porpoises, etc., when they possess teeth in one or both jaws, have them numerous and conical in form; they have no milk predecessors. The stomach is divided into several chambers, but these are not, as in ruminants, connected directly with the gullet; they are rather appendages of the pyloric portion of the organ.

The arrangement of the respiratory and circulatory systems, which enable the Cetacea to remain for some time under water, are interesting. The nostrils open directly upward on the top of the head, and are closed by valvular folds of integument which are under the control of the animal. When the animal comes to the surface to breathe it expels the air violently, and the vapor it contains becomes condensed into a cloud; if the expiration commences before the mouth of the spiracle or blow-hole is above the surface, a little water may be blown up like spray but no water from the mouth is thus discharged, for the soft palate firmly embraces during life the upper end of the larynx, so that the gullet is divided into two narrow passages, while the lungs have a continuous passage to the exterior. The blood vessels, especially those of the thorax and spinal canal, break up into extensive plexuses or networks, in which a large amount of oxygenated blood is delayed, and thus the animal is enabled to remain under water, the necessity for changing the air in the lungs being diminished.

Fossil Cetacea.— Bones of cetaceans, mostly allied to the living species, are found in the marine sediments of the Tertiary and Quaternary ages, and are occasionally dredged up from deep-sea deposits. The hard and heavy earbones are especially apt to be preserved as fossils. The zeuglodons and squalodons of the Eocene epoch represent a peculiar primitive group of cetaceans with two-rooted teeth. Very little is known of the evolution of this order of mammals. The Tertiary deposits of Patagonia are supposed to be rich in material bearing on the evolution of the Cetacea.

Classification of Cetacea.— The sub-orders of cetacea are as follows:

1. *Mystacoceti,* baleen-bearing whales. Its families are: *Balænopteridæ,* rorquals, and other great whalebone whales; *Balænidæ,* right whales and kogias.

2. *Odontoceti,* of which the families are: *Physeteridæ,* sperm-whales (*Physeterinæ*), and beaked whales (*Ziphiinæ*); *Delphinidæ,* dolphins, porpoises, white whales, killers and the like; *Platanistidæ,* river dolphins; and the extinct *Squalodontidæ.*

3. *Archæoceti,* containing the extinct family *Zeuglodontidæ.* The most recent and important work on this order is Beddard's 'Book of Whales' (London 1900). See WHALE, and the names of the various groups and species of cetaceans.

CETEWAYO, sĕt-ī-wā'yō, Kaffir chief or king, son of Panda, King of the Zulus. See ZULULAND.

CETHEGUS, Gaius Cornelius, Roman statesman, one of the associates of Catiline. He was put to death in prison by order of the Senate, at the instigation of Cicero, 68 B.C.

CETHEGUS, Marcus Cornelius, Roman official who flourished in the 3d century B.C. He became curule ædile, 213 B.C.; censor, 209; consul, 204. In 203, he was appointed proconsul of northern Italy, and was successful in driving back the armies of Mago, brother of Hannibal. He was well known for his oratorical ability. Indeed, Cicero, quoting Ennius, refers to him as the "suadæ medulla," "the marrow of persuasiveness."

CETINJE. See CETTIGNE.

CETIOSAURUS, sĕt-ī-ō-sâ'rŭs, a genus of amphibious dinosaurs (see DINOSAURIA), of which fragmentary remains have been found in the Lower Cretaceous (Wealden) of Europe. From the fragments of the skeletons which have been discovered, a fair idea of the proportions of the animal may be conceived. It probably reached a length of 60 or 70 feet and a height of 10 feet.

CETTE, sĕt, France, seaport town in the department of Hérault, built on a neck of land between the lagoon of Thau and the Mediterranean, 18 miles southwest of Montpellier. The space enclosed by the piers and breakwater forming the harbor can accommodate about 400 vessels; and the harbor is defended by forts Saint Pierre and Saint Louis. A broad, deep canal, lined with excellent quays, connects the port with the Lake of Thau, and so with the Canal du Midi and the Rhone, thus giving to Cette an extensive inland traffic; and it has an active foreign commerce. The principal trade is in wine, brandy, salt, dried fruits, fish, dyestuffs, perfumery and verdigris. Cette has shipyards, metallurgical works, salt-works, glassworks, factories for the manufacture of syrups and grape sugar, etc., and carries on extensive fisheries. After Marseilles, it is the principal trading port in the south of France; and it is much resorted to as a watering place. Pop. 33,049.

CETTIGNE, tsĕt-tĭn'yĕ, or **CETINJE,** chĕt-tĕn'yā, Montenegro, the capital of the principality; situated in a lofty mountain valley, 19 miles east of Cattaro. It contains the palace of the ruler and the government buildings, a convent founded in 1478, a girls' institute and other schools, an arsenal and a theatre. Turkish invaders sacked and burnt the town in 1683, 1714 and 1785. Many famous Montenegrin rulers lie buried here. Pop. about 4,500.

CETUS (Lat. whale), a large constellation lying on both sides of the equator, but mostly south of it, one of Ptolemy's original 48. It is surrounded by Pisces, Aries, Taurus, Eridanus, Fornax, Sculptor and Aquarius. It contains the remarkable variable star Omicron Ceti or Mira. It was discovered by Fabricius in 1596. It becomes visible to the naked eye once in 11 months, and after a few days passes out of sight, becoming a star of the ninth magnitude.

CETYL, sē'tĭl, in chemistry, a radical corresponding in structure to the ethyl compounds. It is formulated as $C_{16}H_{33}$ and is derived from spermaceti.

CEUTA, thā'oo-tä, Morocco, a strongly fortified place belonging to Spain, on the coast of Africa, opposite Gibraltar. The town occupies the site of the Roman colony of *Ad Septem*

Fratres, so called from the seven hills rising here in a group, of which the most prominent are Montes Almina and Hacho; on the latter, the ancient Abyla (one of the Pillars of Hercules), is a strong fort, and on the former, among beautiful gardens, lies the New Town. Ceuta contains a cathedral, a hospital and convents, but is chiefly of importance as a military and penal station. The place was a flourishing mart under the Arabs, and there the first paper manufactory in the Western world is said to have been established by an Arab who had brought the industry from China. In 1415 it was captured and annexed by the Portuguese, and fell to Spain in 1580. It has resisted several sieges by the Moors (1694–1720 and 1732), and is still the most important of the four African presidios. Pop. 23,907.

CEVA, chā'vä, **Tommaso,** Italian mathematician and poet: b. Milan, 20 Dec. 1648; d. 3 Feb. 1736. He was admitted into the order of Jesuits in 1663, and spent his life as an instructor in various colleges. His more important mathematical works had reference to angles, for the trisection of which he invented a mechanical instrument. He wrote several biographies in Italian, and many poems in Latin and Italian, two of which, entitled 'Philosophia nova-antiqua'; and 'Puer Jesus,' are still admired. His mathematical works are 'De Natura Gravium' (1669) and 'Opuscula Mathematica' (1669).

CEVALLOS, thā-väl'lōs, **Pedro,** Spanish diplomatist: b. Santander, Biscay, 1761; d. Seville, 29 May 1838. He studied at Valladolid, and entered on a diplomatic career. Having been appointed secretary to the embassy at Lisbon, he there married a niece of Manuel Godoy, Duke of Alcudia, the Prince of Peace, and became afterward Minister of Foreign Affairs. In the disputes between Charles IV and his son Ferdinand he adhered to the latter. Aware of the influence which Cevallos possessed over the Spanish people, Joseph Bonaparte was anxious to gain him over, and offered to take him into his service. Cevallos accepted with apparent willingness, but on arriving at Madrid united with the Spanish junta against Joseph, and was sent by them on a mission to London, where in 1808 he published his celebrated work on Spanish affairs, referring more especially to the proceedings at Bayonne, 'Exposition des faits et des trames qui ont préparé l'occupation de la couronne d'Espagne.' After the Restoration he for some time maintained a great influence over Ferdinand, but on his opposing the marriage of the latter with a princess of Portugal he lost favor, was deprived of his office of Secretary of State and sent as Ambassador to Naples and Vienna. On being recalled in 1820 he retired to private life.

CÉVENNES, sā-vĕn, France, southern district, which at one time formed the northern part of the government of Languedoc. During the wars against the Albigenses and the Waldenses its mountains and valleys were the asylum of numerous persons who had renounced many of the beliefs of the Roman Catholic Church. It now forms part of the departments Haute-Loire, Loire, Ardèche, Gard and Aveyron. Consult Stevenson, R. L., 'Travels with a Donkey' (London 1895); and Ribard, 'L'Histoire cévénale d'après des documents' (Cazillac 1898).

CÉVENNES, sāv-ĕn' (ancient CEBENNA), the chief mountain range in the south of France between the Alps and the mountains of Auvergne, and lying mainly west of the Rhone. With its continuations and offsets, it forms the watershed between the river systems of the Rhone and the Loire and Garonne. Its general direction is from northeast to southwest, beginning at the southern extremity of the Lyonnais Mountains, and extending under different local names as far as the Canal du Midi, which divides it from the northern slopes of the Pyrenees. They are divided into the South and North Cévennes. The Cévennes extend for over 150 miles, through or into nine departments, the central mass lying in Lozère and Ardèche, where Mount Lozère attains 5,584 feet, and Mount Mézen (the culminating point of the chain) 5,754 feet. The average height is from 3,000 to 4,000 feet. The mountains consist chiefly of Primary rocks, covered with Tertiary formations, which in many places are interrupted by volcanic rocks. The Cévennes served as a retreat for numerous Protestant families after the revocation of the Edict of Nantes.

CEYLON (Sanskrit *simhala,* from *simha,* lion; Latin *Taprobane,* and Hindu *Silān*), an island possession and Crown colony of Great Britain, in the Indian Ocean, about 60 miles southeast of the southern extremity of Hindustan, from which it is separated by the Gulf of Manar and Palk Strait. It lies between lat. 5° 55′ and 9° 50′ N., and between long. 79° 41′ and 81° 54′ E., having the shape of a pear, with the broad end south. Length, about 266 miles; average breadth, 100 miles; area, 25,364 square miles. The northern and northwestern coasts are flat and monotonous, those on the south and east bold and rocky, presenting a highly picturesque appearance, which is further heightened by the exuberant vegetation, the noble palm forests, the luxuriant corn fields and the verdant slopes of the mountains enameled with bright flowers, herbs and creeping plants, whose delicious perfume spreads far and wide. Many parts of the coast, at its southern and northern extremities, are studded with small, rocky and verdant islands, some of them overgrown with palms, and presenting a singularly beautiful appearance. At Trincomalee, on the northeastern coast, there is one of the finest natural harbors in the world; at Galle on the southern coast there is also a harbor; while the harbor at Colombo, the capital, is capable of admitting the largest vessels, and is now the regular calling-station for mail steamers to and from Calcutta, China and Australia. Between the island of Manar on the northwestern coast of Ceylon and the island of Ramiseram on the coast of India is a ridge of sandbanks called Adam's Bridge, which nearly connects Ceylon with the continent, being intersected only by three narrow shallow passages, the remainder being covered with two or three feet of water at full tide. These channels admit only very small vessels, but ships of some size can get through between Ramiseram and the mainland.

Mountains.— The mountainous regions of Ceylon are confined to the centre of the southern and broader part of the island. They grad-

ually diminish to hills of moderate elevation as they recede from the central mass, and are succeeded on the western side by a flat tract extending to the coast. Their average elevation is somewhere about 2,000 feet, but there are several summits upward of 7,000 and 8,000 feet high. The highest summit is Pedrotallagalla (8,280 feet), but Adam's Peak, reaching 7,420 feet, is the most remarkable from its conical form, the distance from which it is visible from the sea and from the sacred associations with which it is connected, the summit being the point from which Buddha, according to his followers, ascended to heaven, a gigantic footprint bearing testimony to the fact. Other summits are Tolapella (7,720 feet) and Kirrigalpota (7,810 feet). The forms of the mountains of Ceylon are singularly varied. They most frequently occur connected in chains, and terminate in round or peaked summits. Their sides are always steep and occasionally precipitous and rocky. There is no proportional correspondence between the heights of the mountains and the depths of the adjoining valleys, and often the valleys are extremely narrow. The deepest are in the heart of the mountains. Some are between 3,000 and 4,000 feet deep, and not over half a mile wide.

Rivers and Lakes.— The rivers of Ceylon, though numerous, especially on the southern and southwestern sides, are small, being merely mountain streams, navigable only by canoes, and that but for a short distance from their mouths. The Mahavela-ganga, which rises near Adam's Peak, and falls into the sea by a number of branches near Trincomalee, is by far the most important. It has a course of 134 miles and drains upward of 4,000 square miles. The timber growing on its banks in great abundance, consisting of halmalille, ebony, satin-wood, etc., is floated down to the harbor during the freshets. Of the remaining rivers the Kalani-ganga, the Kala-ganga and the Maha Oya reach the sea on the western coast; and the Gintota-ganga at Galle. All the rivers are liable to be surcharged with rain during the monsoon, and to inundate the level country. Subsequently the heat of the sun drying the country produces malaria. There are numerous extensive lagoons or back-waters round the coast, but no lakes in the island worth noticing, the largest being only four miles broad. There are rills and streamlets rushing along in every direction among the mountains, so overhung with superabundant vegetation as to be frequently invisible.

Geology and Mineralogy.— Ceylon is mostly formed of ancient stratified rocks, but owing to the obliteration of fossil remains it is doubtful whether they have been deposited on the beds of seas or lakes. The mountains are composed of Primary and metamorphic rocks, the prevailing rock on the island being gneiss, though laterite (or "cabook") and a sort of dolomite also occur in considerable quantities. In the Nuwara-Eliya district and elsewhere there are large alluvial tracts. Basalt is found near Galle and Trincomalee, and at Pettigalla-kanda an ancient lava occurs. The soil is mostly formed from the disintegration of gneiss. The western coast of the island is believed to be rising. Plumbago is found in sufficient quantities to make it of commercial importance, and among the metals occurring in the island are iron in fair quantity, manganese, gold, platinum, molybdenum, nickel, cobalt, copper and tin. No coal has been found, but nitre and salt occur (the latter is also a somewhat important article of manufacture). Gems of many kinds are abundant, particularly near Ratnapura. They are found either embedded in the rock or washed down in the alluvium of river-beds, and include zircons, amethysts, cat's-eyes, topazes, moonstones, garnets, spinel, sapphires, rubies, cinnamon stones, etc. There are hot springs at Bintenna, Trincomalee and Puttalam.

Roads and Transportation.— Ceylon is now well provided with roads. A highway has been made from Colombo to Nuwara-Eliya, 6,000 feet above the level of the sea. A continuous line, 769 miles in length, makes the entire circuit of the coast, and every town of importance is connected by roads with the two chief cities. The roads in general are good, many of them being macadamized, and in the neighborhood of the chief towns are adapted for carriages. During the monsoons, however, the roads in many parts are impassable from inundations. The building and maintenance of roads, bridges, streets and canals forms one of the chief items of expenditure of the government. Railroad extension is also a government affair, and there are now about 604 miles in all, the main line being that between Colombo and Kandy (75 miles). In the early part of the 19th century there was not a single road in the country, merely a few pathways, the greater part of the island being then covered with impenetrable forests.

Climate.—Where the jungle has been cleared away and the land drained and cultivated, the country is healthy; where low, wooded tracts and flat, marshy lands abound, covered with a rank, luxuriant vegetation, the climate is eminently insalubrious, showing, what is now pretty well understood, that mere heat has little to do with the unhealthfulness of tropical climates. The heat is not so great as on the neighboring coast of India, the sea-breezes moderating the temperature. At Colombo, on the western side of the island, near the 7th parallel of north latitude, the mean daily variation of the temperature does not exceed 3°, and the annual range is from 76° to 86° F. At Nuwara-Eliya (6,000 feet high) the annual range is from 32° to 80°. The eastern part of the island, being exposed to the northeastern monsoon, has a hot and dry climate, resembling that of the coast of Coromandel; while the western division, being open to the southwestern monsoon, has a humid climate like that of the Malabar coast. The quantity of rain that falls annually in Ceylon is estimated at three times the quantity that falls in England, the rains being less frequent, but much heavier. The interruption which the course of the monsoons meets with from the mountain ranges of the island causes deluges of rain to fall on one side, while the other is parched with drought. At Kandy, in the interior, the average annual fall of rain is 85.3 inches; at Colombo, on the seacoast, 75 to 80 inches. The prevalent diseases are those of the liver and intestines, often accompanied by fever. Elephantiasis and other cutaneous complaints are common. The very fatal disease called beriberi (*Hydrops asthmaticus*) occasionally occurs.

Animals.— Most of the animals found on the opposite continent are native to this island,

excepting the royal tiger, which does not exist here. Elephants are numerous, especially in the northern and eastern provinces, where they sometimes do great injury to the growing crops. The elephants of Ceylon are esteemed for their superior strength and docility. The eagerness with which they are hunted has greatly diminished their numbers. Since 1869 licenses for the capture and exportation of elephants must be obtained from the government. Bears, buffaloes, leopards, jackals, monkeys and wild hogs are numerous. There are several species of deer, of which the elk and fallow deer (properly the great red Sambar and spotted axis) are most abundant. Porcupine, bandicoots, squirrels (flying and other), bats, mungooses, are to be found, as are also the pangolin or scaly ant-eater and the loris or Ceylon sloth. Flying foxes and rats are numerous. Pheasants, snipes, partridges, pigeons, peacocks and a great variety of birds, of splendid plumage, are plentiful. Crocodiles, serpents and reptiles of all sorts abound. Of the snake tribe, consisting of about 26 different species, six only are venomous. Among the insects are the leaf and stick insects, the ant-lion, the white ant, etc.

Vegetable Products.— In the luxuriance of its vegetable productions Ceylon rivals the islands of the Indian Archipelago, and in some respects bears a strong resemblance to them; its most valuable products are tea, rice, coffee, cinnamon and the cocoanut. Coffee used to be the chief cultivated crop, but disease has within recent years much reduced the product. Cinnamon grows in the southwest, to which it is almost exclusively confined, requiring a sandy soil with a moist atmosphere. The trade in this spice was reserved as a government monopoly by the Dutch when they had possession of the island; all that was collected beyond the quantity which it was thought could be sold at a monopoly price being burned. This absurd system was followed by the English for some years after their conquest of Ceylon, but was abandoned in October 1832, when the trade in cinnamon was declared free, subject to a duty on exportation. The cocoanut-trees grow along the entire western and southern coasts in countless numbers, each tree producing from 50 to 100 nuts in the year. Every part of this invaluable tree is capable of being turned to profitable account. The Palmyra palm, which grows principally in the northern part of the island, is of hardly less importance than the cocoanut, being productive in seasons of drought, when the crops fail. The jaggery palm, or kittul-tree, is cultivated for the sake of its sap, which yields a coarse sugar; its pith furnishes a kind of sago, and its fruit is also eaten. The taliput palm also abounds, as do the jack- and bread-fruit trees, the fruit of which is used by the natives for food, both raw and cooked; the timber, also, of the jack-tree, not being subject to attack by the white ant, is much used by the natives for making furniture and in house-building. The Ceylon areca nut, celebrated for its superior qualities, is exported in large quantities. Tobacco is raised principally in the northern district and is of excellent quality. Indigo grows wild, but is not sought after. The cardamom plant is abundant, but inferior to that of Malabar; fruits and culinary vegetables are produced, the latter in the elevated districts, in great variety and profusion. The island abounds with timber of various descriptions, including calamander, satin, rose, sapan, iron, jack, halmalille and other beautiful woods adapted for cabinet work. Agriculture generally, and the cultivation of the more valuable native products of the island in particular, are improving. As already stated, coffee once was the chief crop, but latterly the cultivation of tea, cinchona and cacao has been carried to such an extent that the island has become less dependent on a single article of produce. Notwithstanding the acknowledged fertility of Ceylon, the capabilities of its soil where justice is done it and the efforts now in progress to develop these capabilities, by far the largest proportion of the island is still uncultivated. There are a few natives who possess considerable estates in land; but the law of inheritance has, for the most part, caused a minute subdivision of the soil, to a degree very unfavorable to its improvement. The British government claims the proprietorship of all the waste lands, which are now disposed of by public sale. Among works carried on by the government are irrigation works in suitable localities, including the cutting of channels, the construction of annicuts or dams and the formation and repair of tanks. Some of the ancient works of this kind are of great magnitude. There is also a government forest department, part of the work of which is to provide fuel for the railroads and timber for government works.

Pearl-fishery, etc.— There has long been a pearl-fishery on the coast of Ceylon, carried on as a government monopoly. The fishery sometimes fails for years, there having been none, for instance, between 1837 and 1854, or between 1863 and 1874. Although the government still continued a strict surveillance over the banks, and occasionally subjected them to a careful examination, scarcely any trace of the pearl oyster was to be found. No cause has yet been discovered for his disappearance. When the pearl-fishery is in existence it is confined to the Gulf of Manar, where the oyster banks extend for 60 or 70 miles along the coast south of Manar, and perhaps 10,000 people, including 2,500 divers, will assemble in the fishing season. The Ceylon pearls are whiter than those of Ormuz or the Arabian coast. The chank or conch fishery was at one time carried on to a great extent, employing about 600 divers, but has greatly declined owing to the little demand now made for them in Bengal, to which the greater part were sent. The chank is a sea-shell (*Voluta pyrum*), adapted for cutting into rings, these being formerly used in great numbers by the native women of Hindustan for bracelets and anklets.

Manufactures and Trade.— The manufactures of Ceylon are very unimportant with exception of arrack, which is distilled from the juice of the cocoanut-tree. The spinning and weaving of cotton goods, generally of the coarsest kind, was at one time a considerable industry, but is now dying out. There are numerous oil-mills for pressing the cocoanut kernels to express the oil. The Singhalese make good artisans, as is experienced at Colombo, where they are employed in making steam engines and other machinery. They are skilful in carpentry and wood-work, expert workers in gold and silver and excel in the

manufacture of lacquered ware. Salt is a government monopoly, being collected from shallow lagoons which at certain seasons are overflowed by the sea, or it is manufactured in pans, the property of the government. The exports are chiefly tea, coffee, copra, rubber, cinchona, cinnamon, cocoanut products, areca nuts, cacao, cardamoms, plumbago, tobacco. Tea has only begun to be exported in recent years, and the export increased from 2,392,975 pounds in 1884, to more than 183,000,000 pounds in 1909, and by 1911 the value of the tea exported was more than twice that of exports of rubber; but the area devoted to the latter product increases rapidly. The trade of Ceylon is chiefly carried on with Great Britain and India. The principal articles of import from Great Britain are coal, cotton manufactures, apparel and haberdashery, iron and steel manufactures, machinery, etc. From other countries are imported rice, dried fish, wheat, sugar and various other commodities. In 1915 the imports totaled $53,089,540 in value, and the exports $83,692,283.

Government, etc.—The government of Ceylon is conducted by a governor and two councils, executive and legislative, of both of which the governor is president. The first is composed of seven members, including the governor; the other of 21 members, including the members of the Executive Council, other officeholders and unofficial members selected by the governor as representative of the different classes and interests in the community. The powers of the councils are limited, being subordinated to those of the governor. All laws must be approved by the Secretary of State for the Colonies before they can take effect. Any individual properly qualified may be appointed to the most responsible situation, without reference to service, nation or religion, and native Singhalese have occupied some of the highest posts. The island is divided into nine provinces — the Eastern, Western, Northern, Southern, Central, North Central, Northwestern, Sabaragamuwa and Uva, and subdivided into districts. In each province is stationed a government agent. The criminal law has the Penal Code of India as its basis; the civil law is of Roman-Dutch derivation but is modified by colonial ordinances. For the administration of justice there are in the civil and criminal departments, a Supreme Court, established at Colombo; also a Vice-Admiralty Court, provincial courts in various districts; beside magistracies, local boards in the towns and the native village councils. The chief sources of revenue are the customs duties, railroad receipts, land rents and salt farms. The chief articles of export are now free. The revenue for 1913 was $17,057,510; expenditures $15,890,310. The public debt amounts to about $23,000,000; but the finances are in a very healthy condition, as the public debt of the colony has been mostly incurred for the construction of railroads.

Races.— The present population of Ceylon is composed of Singhalese or Ceylonese, descendants of immigrants from Hindustan who entered the country in the 5th century B.C., Malabars or Tamils, originally from southern India, Moors, Malays, Veddas and a small proportion of Europeans and their descendants. The Singhalese inhabiting the coasts are a mild, timid race, obsequious to strangers, and hospitable and humane. Their stature is rather below the middle size; their limbs slender, but well shaped; eyes dark, finely cut features, hair long, smooth and black, turned up and fixed with a tortoise-shell comb on the top of the head; color varying from brown to black, or rather from the lightest to the darkest tints of bronze. The Singhalese of the interior, or Kandian Singhalese, are a superior race, being stouter, handsomer, and of more manly and independent bearing, with a greater degree of intelligence. The Malabars of Ceylon are similar in all respects to those of the continent. The Mohammedans or Moors are an energetic and industrious people, and engross a large proportion of the commerce and traffic of the island. The Veddas are supposed to be a portion of the aboriginal inhabitants of Ceylon. They inhabit the most secluded and inaccessible parts of the island, and subsist entirely on wild fruits and animals. A cloth round the loins is their only clothing; and their habitations, generally of small dimensions, are formed for security among the branches of large forest trees. They are a robust and hardy race, but extremely peaceable and inoffensive. The other inhabitants of the coast consist of Dutch, Portuguese and English, some Malays or natives of the Eastern Archipelago, a few Chinese and Parsee traders and a varied population sprung from the intermixture of these races with each other. The descendants of the Dutch and other Europeans are known as burghers. The population is rapidly increasing. In 1832 it scarcely amounted to 1,000,000; while in 1881 it was 2,750,000. In 1901 the total was 3,576,990, including 2,334,817 Singhalese, 952,237 Tamils, 224,719 Moors and in 1908, 4,038,456. The census of 10 March 1911 showed the number of inhabitants to be 4,110,367. The number of laborers on the plantations was about 510,000 in 1912. This includes a large number of coolies who come from India for employment.

Religion, Language, Education.— More than half the population are said to be Buddhists, and about 800,000 are of the Hindu religion (sects of Brahmanism). Buddhism chiefly prevails in the interior and generally among the Singhalese of the seacoasts. It is maintained and protected by the British government, agreeably to the treaty of 1815. On the western and southwestern coasts numbers of the Singhalese profess the Roman Catholic religion. There are a number of Episcopal clergymen in the island, subordinate to the bishop of Colombo; various other Protestant bodies have places of worship, but the Protestants are less than half the number of the Roman Catholics. The Singhalese have a colloquial language peculiar to themselves, but their classic and sacred writings are either in Pali or Sanskrit. The Malabars use the Tamil. English is becoming more and more common, and there is scarcely a roadside village in Ceylon now where the traveler could not find some persons to speak English, or interpret for him. The government has a department of public instruction, and good progress is being made in education throughout the island. On 1 Jan. 1912 there were more than 325,000 children participating in public instruction, a number of the schools being maintained or aided by the government.

There are schools maintained also by the Church Missionary Society, by the Wesleyan, the American and the Baptist Missionary societies, besides a number of private and some regimental schools.

Antiquities, History, etc.— The Singhalese annals contain a historical record of events for 24 centuries; and their authenticity, as regards description of ancient towns and buildings, and other works of art, is established by existing ruins, proving that the island had been, at a remote period, inhabited by a powerful and numerous people. Long forgotten, and for ages hidden by dense jungle growths, the ancient capitals of Ceylon now afford a wonderland of interest for the archæological investigator and the tourist alike. Scores of bell-shaped relic houses, ranging up to 400 feet in height and 1,500 feet in circumference, form the gigantic ruins that now make up the principal monuments to the magnificent civilization, the rival of Rome in luxury and architectural grandeur. The cities were two in number, Anuradhapura, the ancient Singhalese capital, from about 1000 B.C. to 500 A.D., and Polonarawa, the mediæval capital, which flourished in the 12th century. The grandeur of the mighty capital Anuradhapura can be guessed from the fact that the king's pleasure garden in the centre of the city was 20 square miles in extent. After his conversion to Buddhism, King Tissa donated these gardens for religious uses. The ruins of the temples and dagabas erected here form the majority of the monuments that not only bear record to the vastness and splendor of that age, but are now — 2,000 years later — taking their places among the wonders of the world.

Starting from the centre of the modern native town, numbering scarce 50,000 souls, on a tour of the ruins, one comes at first to the forest of monoliths remaining from the original 1,600 granite columns upon which rested the remarkable Brazen Palace. As this edifice, built by King Dutthagamini about 200 B.C. for his Buddhist monks, is typical of all the palaces of that day, the following description written about 500 A.D. by Buddhist monks is of interest: "This palace was 100 cubits square — length, breadth and height all being the same. In it there were nine stories, each with 100 apartments. All these apartments were highly finished in silver; all the cornices thereof were embellished in gems. The flower ornaments thereof were also set with gems, and the tinkling festoons were of gold. In the centre of the great hall of the palace was an ivory throne, on one side of which was a sun in gold, on another the moon in silver, on a third the stars in pearls," ending with "the building was covered with brazen tiles, hence its name, the Brazen Palace." Next in importance comes the Ruanweli Dagaba. A dagaba, or relic-house, was a bell-shaped mound of solid bricks built both as a monument for and to protect for all time a tiny sacred relic hidden in the centre of its base. The Ruanweli is in a much ruined state, but enough remains to show its ancient structure. The Thuparama Dagaba, near by, is in good repair. It was built by King Tissa in 306 B.C., and antedates any existing structure in Ceylon or India, and is still, though much smaller than the others, a remarkable monument to the skill of its builder. Originally 176 ornamental pillars of graded heights surrounded the Thuparama; of these but 31 now remain standing. The Abhayagiriya Dagaba is 405 feet high, with a dome 360 feet in diameter and a base covering eight acres. Other monuments are the king's palace with its beautiful "moonstone" entrance and decorative guard stones by the side; marble bath tanks equaling Rome's in luxury; elephant houses and great tanks where the state elephants were wont to take their morning plunge, and where their wild descendants still come to bathe; the curious Isurminia temple dug out of a mammoth boulder on the edge of an artificial lake, and finally the sacred Bo-tree itself, transplanted here in 288 B.C. and said to be the oldest cultivated tree in the world. It was originally a branch of the fig tree under which Buddha had been accustomed to sit and meditate. Polonarawa, the mediæval capital, lay 40 miles southeast of Anuradhapura. A British archæological commission is at work here, excavating and restoring the grandest of ruins. Temples, monasteries, dagabas rivaling the Pyramids in magnitude engage the attention of the visitor. The most interesting of all relics discovered was the temple called the Gal Wikare, and the three giant figures at its entrance — a sitting figure of the Buddha 15 feet high; a statue of Ananda, Buddha's disciple, 23 feet high, and a recumbent statue of Buddha, 46 feet long. Other remarkable remains are the theatres, bathing halls, gardens, fountains, public buildings that shone with roofs, doors and windows of gold, and the group of ruined monuments at the rock of Sigiri. At Dambulla there is a celebrated cave temple, dating from the 1st century B.C.

Ceylon was known to the Greeks as Taprobane. In 543 B.C. it was conquered by Vijaya, a prince from the mainland of India, and for several centuries the island enjoyed great prosperity under the generally beneficent rule of his dynasty. The Hindu immigrants brought with them the civilization of their own country, and a great part of Ceylon became covered with towns and villages. Several of Vijaya's successors had to contend with invading Malabars, and these ultimately secured the sovereignty. A restoration of the line of Vijaya in the 11th and 12th centuries contributed to the return of something of the ancient grandeur of the island. Little was known regarding it in Europe until 1505, when the Portuguese established a regular intercourse with Ceylon, being encouraged thereto by a native king. The Portuguese were subsequently expelled by the Dutch in 1658, after a stubborn struggle of 20 years' duration. The Dutch soon opened up an extensive and profitable trade with Holland, and they constructed several canals to serve as means of communication between their various posts on the island. Their policy, however, though beneficial on the whole to the Singhalese as well as themselves, was essentially a selfish and exclusive one. British intercourse with the island began in 1763, and in 1795, owing to the war with France and Holland, Great Britain was induced to attempt an effective occupation of it. In that year Trincomalee was captured, and in the following year Colombo; and by these victories all the Dutch forts were transferred

to Great Britain. By the Peace of Amiens (1802) the whole coast territory was formally ceded. The King of Kandy, who remained in possession of the central mountainous region, perpetrated such atrocities on his own people that many of their chiefs in 1815 entreated Great Britain to depose him. A short campaign was ended by the capture of the tyrant and his deportation as a prisoner to India, and since then the whole island has been under direct British rule. A serious rebellion in 1817 and minor ones in 1843 and 1848 have been the only breaks in the generally tranquil subsequent history of the colony. British rule has contributed very largely to the material advancement of the island by the construction of roads and railways, the extension of the Dutch canal system, the restoration of irrigation tanks, the bridging of rivers and the development of its great natural resources. Two important events in its modern history have been the rise and decline of coffee-planting (say from 1837 onward), and the substitution of tea-planting (about 1878) in its place. The decline of coffee-planting, as is well known, has been caused by a leaf-fungus. The planting of cinchona, cacao and rubber-trees has also helped to add to the resources of Ceylon in recent times. The rapid development of the rubber industry during the decade ending in 1916 has been mentioned above. In 1901 a considerable number of Boers, captured by the British in the South African War (q.v.), were sent to Ceylon.

The principal towns of the island are Colombo, Trincomalee, Kandy, Galle, Jaffna and Kornegalle. The urban population is 11.8 per cent of the total number of inhabitants which, on 1 Jan. 1914, was given as 4,262,097. See also above: RACES.

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CÉZANNE, Paul, sā-zän', French painter: b. Aix-en-Provence 1839; d. there 1906. He was the son of a banker and so, in spite of the failure of his pictures to find purchasers for the greater part of his lifetime, he did not, most happily, have to contend with poverty. Emile Zola was a schoolmate of Cézanne's and it was he who induced the latter to come to Paris in 1861. From this year on his time is divided between Aix and Paris, the years from 1861 to 1882 being spent principally at the capital, where he came into contact with the best men of his generation, the latter years of his life being passed mostly in the south where he could work out his ideas more quietly. Zola had introduced Cézanne to his friend Manet and the young painter was soon acquainted with the whole band, soon to be styled the Impressionists, Renoir and Pissarro being especially his friends. He exhibited with them in 1874 and again in 1877, when he sent in 17 oil paintings. Discouraged by the ridicule of critics and by his differences with the Impressionists, he retired in 1879 to Aix, where he spent the remainder of his life. In this seclusion he developed a style of amazing originality, which has exercised a profound influence upon the radical younger generation, who hail him as a prophet and a leader. After a fervent and profound study of the old masters and an adoring acceptance of the art of Delacroix and Courbet, Cézanne's next step was, logically, to make himself master of the principles of their successors. This he did, especially during the two years that he lived with Pissarro at Auvers-sur-Oise, 1873–74. But while the modern ideas of light were his study at this period he never lost sight of the masters of the Louvre, and he made endless experiments in applying latter-day knowledge to classic principles of design. «Imagine Poussin painted again according to our ideas of nature» was one of his characteristic remarks. With the early years of the '80's he is ready to begin a painting where personal inclination takes on more and more prominence as compared with inherited values. As a true Frenchman, and a true classicist in the best sense of the word, the qualities he adds to his art in later life are derived from those, observable in less emphasized form, in the art of the past. Cézanne observed the design and color of the old masters and found that with the best of them these qualities are present as a living organism throughout the entire picture. He saw that it was precisely in this regard that the painting of his time was falling short of the excellence of the past. Without dreaming for a moment of returning to the vision of nature or the formula of painting of the old masters, he applied their demand for a firm basis of design to the painting of the earlier 19th century. The picture at the Luxembourg, 'L'Estaque,' shows him on the road to his new style, the landscape at the Metropolitan Museum (1888) shows him firmly in possession of it and already obtaining his results with the assured stroke of a master. His later years, however, showed no inclination to rest on his achievement or to repeat himself. On the contrary he goes untiringly ahead, making more and more clear to the younger generation (who began to follow him about 1885–90) that a profound idea of nature and an overwhelmingly sufficient statement of her aspects can be made by the setting down of a few essentials. His treatment of form and color rose to always grander heights and he is to-day almost universally considered one of the greatest of creative artists. While the larger part of his works is still in private collections he is represented, besides the museums noted above, in the Louvre ('The Card Players' and 'Flowers'), at Berlin ('Still Life' and 'The Bouquet'), at the Neue Pinakothek, Munich ('Self-Portrait' and 'Fruits'), at the Museums of Mannheim, Christiania, in the Havemeyer collection, New York, etc. Consult Meyer and Graefe, 'Paul Cézanne' (Berlin 1910), and Burger, 'Cézanne and Hodler' (Munich 1913). The story of Cézanne's struggles and career is depicted in Zola's 'L'Œuvre,' of which he is the hero.

CHABANEAU, shä-bä-nō, **Camille,** French philologist: b. Nontron, 4 March 1831; d. 1909. From 1879 until his death he was professor of Romance languages at Montpellier. In 1895 he

was made a chevalier of the Legion of Honor, and later was the recipient of an honorary doctorate from the University of Halle-Wittenberg. He was not only a leading authority on Provençal philology, but made numerous valuable contributions to the history of Languedoc. He wrote 'Histoire et theorie de la conjugaison française' (1868); 'Grammaire limousine' (1876); 'La langue et littérature provençales' (1879); 'Biographies des troubadours' (1885); and contributed largely to the *Revue des langues romanes.*

CHABANEL, Noel, Jesuit missionary among the Huron Indians: b. France, 2 Feb. 1613; d. 8 Dec. 1649. In 1630 Chabanel entered the Jesuit novitiate at Toulouse and was professor of rhetoric in several colleges of the Jesuits in that province. He was sent to Canada in 1643, where, after studying the Algonquin language for a time, he was sent as missionary to the Hurons, among whom he labored until his death. He had as companion of his labors the Rev. Charles Garnier. Their deaths at the hands of a renegade Huron are told of in the 'Jesuit Relations' of 1649–50. Consult Shea, 'History of the Catholic Missions' (New York 1855).

CHABAS, shä-bä, **François,** French Egyptologist: b. Briancourt, 2 Jan. 1817; d. Versailles, 17 May 1882. Though at first engaged in commerce, he found time to become a learned linguist, but it was not till 1851 that he gave himself up to the study of hieroglyphics. The first results of his studies appeared in 1856, followed by a series of invaluable books and papers, elucidative chiefly of two important periods of ancient Egyptian history — the conquest of the country by the Hyksos and the time of their expulsion. Among the more important of his many books are 'The Shepherds in Egypt'; 'History of the 19th Dynasty and especially of the Period of the Exodus'; and 'Studies of Historical Antiquity from Egyptian Sources.' From 1873 to 1877 he edited *L'Egyptologie.*

CHABAZITE, a member of the zeolite family of minerals of variable composition, but in general definable as a hydrated silicate of aluminum, calcium and sodium, with small amounts of potassium and occasionally of barium and strontium. It has a hardness of from 4 to 5 and a specific gravity of about 2.1. It is transparent or translucent, and varies in color from white to pale red or yellow. It occurs in rhombohedral crystals that are sometimes barely distinguishable from cubes, and also in amorphous forms. It is widely distributed, and usually occurs in connection with basalt, syenite, gneiss, or mica, or hornblende schist.

CHABERT DE COGOLIN, shä-bär dė kō-gō-läṅ, **Joseph Bernard,** Marquis, French geographer: b. Toulon, 28 Feb. 1724; d. 1 Dec. 1805. He entered the marines as a cadet in 1741. In 1750 he sailed to the North American coast, and on his return published the result of his observations in an astronomical and hydrographical work, entitled 'Voyage sur les Côtes de l'Amérique Septentrionale' (1753). In 1758 he was chosen a member of the Academy. In the American war Chabert distinguished himself so highly that in 1781 he was made commander of a squadron. In 1792 he was made vice-admiral. During the same year the Revolution drove him to England. In 1800 he lost his sight in consequence of his intense application to study, and in 1802 returned to Paris, where Bonaparte assigned him a pension. In 1804 he was appointed a member of the Bureau des Longitudes, and in 1805 presented to it a map of Greece and a description of the coasts of that country.

CHABLAIS, shä-blā', France, a district in Savoy, south of the Lake of Geneva. At one time it formed part of the kingdom of Burgundy, but in the 11th century came into the possession of the counts of Savoy. In 1860 it was ceded to France, along with the rest of Savoy, by Victor Emmanuel, King of Sardinia. It now forms the arrondissement of Thonon (its ancient capital), in the department of Haute-Savoie.

CHABLIS, shä-blę', France, town in the department of Yonne, on the left bank of the Serein, 11 miles east of Auxerre. It stands in the midst of vineyards which produce the celebrated white wine known by its name, of which the most esteemed are Clos, Bouguerots, Moutonne, Grenouille, Montmaires, Lys and Vaux-Désirs. The annual product is about 4,400,000 gallons, but the quantity sold over the world as Chablis is much greater. There are manufactures of biscuits. Pop. 2,227.

CHABOT, shä-bō, **François,** French revolutionist: b. Saint-Geniez, France, 1759; d. Paris, 5 April 1794. In early life he entered the Capuchin order, which he abandoned in order to devote himself to the Revolution. The bishop of Blois nominated him his vicar-general, and succeeded in getting him chosen deputy to the national convention for the department of Loire-et-Cher. In this capacity he displayed the bitterest animosity against the King and his ministers and all deputies friendly to moderate courses, and labored incessantly to overturn the throne. His party, from occupying the higher seats of the national convention, was designated by the name of «La Montagne,» which it has since retained. The conversion of the cathedral of Notre Dame into the Temple of Reason is said to have originated with Chabot. He at last became suspected by his party of bribery and falsification. When he saw that he was lost he swallowed poison and three days afterward he was guillotined.

CHABOT, Jean-Baptiste, French hagiographer: b. Vouvray, Indre-et-Loire. He was educated at the Seminary of Tours and at Louvain University, also at the Sorbonne School of Higher Studies. He was ordained to the priesthood in 1885 and for some time had charge of the department of missions in the Ministry of Public Instruction. He was director of 'Corpus Scriptorum Christianorum Orientalium' (Vols. I–LXXVI, 1903–14) and associate editor of 'Corpus Scriptorum Semiticarum,' of the Academy of Inscriptions and Belles-Lettres, which awarded him prizes in 1897 and 1900. In 1895 he was one of the nominees for the chair of Aramaic languages and literatures at the Collège de France. His published works include 'Notes d'epigraphic et d'archéologie orientale' (1897–1901); 'Les evêques Jacobites du VIIIe au XIIIe siècle d'après la chronique de Michel le Syrien' (1901); 'Narsai le Docteur et les origines de

l'Ecole de Nisibe' (1905); 'Eclaircissements sur la littérature syriaque' (1906); 'Les langues et les littératures araméennes' (1910); 'Les Saints Evangiles,' with Introduction and Notes (1911). He edited 'De Sancti Isaaci Ninivitæ Vita, Scriptis et Doctrina' (1892); 'Histoire de Mar Jabalaha III et du moine Rabban Cauma' (1895–96); Jesus-Yahb Adiabenus, 'History of Jesus Sabrau,' Syriac text and introduction (1897); 'Synodicon Orientale' (1902); 'Documenta ad Origines Monophysitarum illustrandas,' etc., etc. He collaborated in 'Orientalische Studien' (1906); the *Revue Sémitique, Revue Biblique,* etc.

CHABOT, Philippe de Brion, French admiral: b. about 1480; d. 1 June 1543. Having bravely defended Marseilles in 1524, he was made prisoner at Pavia in 1525. Appointed admiral immediately after his release, he was sent to Italy in 1529 to negotiate the ratification of the treaty of Cambrai by Charles V. Made commander-in-chief of the forces of Savoy in 1535, he effected the conquest of part of that country and of Piedmont, but was censured for not following up his victory. On his return to France he became involved in the intrigues of the court and charges of fraud upon the national treasury were brought against him. Found guilty and imprisoned, he was soon afterward pardoned by the King at the urgent solicitation of the Duchess d'Étampes, and reinstated in his position. He is said to have been the first to suggest the project of colonizing Canada. His letters in manuscript are at the National Library of France in two volumes.

CHABRIAS, kā'brī-ăs, Athenian general. In 392 he succeeded Iphicrates in the command of the Athenian forces before Corinth, was afterward sent to chastise the Æginetes for depredations on the coast of Attica, and assisted Evagoras in Cyprus, and Acoris in Egypt, against the Persians. In 378 he commanded the army which the Athenians sent to the aid of Thebes against the Lacedæmonians, under Agesilaus, on which occasion he saved his troops from impending defeat by a military manœuvre renowned in antiquity, commanding them to await the attack of the enemy with pointed spear and shield resting on one knee. In 376 he won an important victory over the Lacedæmonian fleet off Naxos. The Athenians having abandoned the alliance of Thebes, he defended Corinth against Epaminondas. He took part in the expedition against Thrace at the outbreak of the so-called social war. At the siege of Chios his vessel was the first to enter the harbor, but becoming isolated and disabled was soon abandoned; he alone refused to save his life, and fell fighting, 357 B.C. He was the last of the great Athenian generals. Demosthenes said that he conquered 17 cities, took 70 vessels, made 3,000 prisoners and enriched the treasury of Athens with 110 talents. One of his apothegms, for which he was celebrated, was that an army of stags led by a lion is superior to an army of lions led by a stag. His life was written by Cornelius Nepos.

CHABRIER, shä'brē'ā', **Alexis Emmanuel,** French composer: b. Ambert, France, 18 Jan. 1841; d. Paris, 13 Sept. 1894. He at first studied law, but presently turned his attention to music. He composed the operas of 'Gwendoline' (1886) and 'Le Roi Malgre Lui' (1887). Other works by him are 'Dix Pieces Pittoresques' and 'España,' an orchestral rhapsody.

CHAC-MOOL, shäk-mool', according to tradition, a chief of the Maya Indians of Yucatan. In 1876 a statue was discovered in the ruins of Chichen-Itza, Yucatan, to which Le Plongeon gave the name of Chac-Mool, because he supposed it to be a representation of the chief. The statue was taken by the Mexican government and placed in the National Museum of Mexico, but the correctness of Le Plongeon's identification is in question among archæologists.

CHACABUCO, chä-cä-boo'kō, Chile, a mountain and mountain pass, 28 miles north of Santiago, in the province of that name. It is celebrated as the scene of a decisive victory of the republicans over the royalist troops on 12 Feb. 1817.

CHACMA, chăk'mą, the Hottentot name for the baboon (*cynocephalus porcarius*) native to western Africa. It is grayish-black in color and has a well-marked crest of hair along the neck. It is larger than the allied species of its native region. See BABOON.

CHACO, chä'kō, South America, a government or territory in the north of the Argentine Republic bordering on the Paraguay River. Its chief town is Resistencia. See CHACO, EL; CHACO, EL GRAN.

CHACO, El, Argentina, a territory ("territorial government"), bounded on the north by the territory of Formosa, on the east by Paraguay and the province of Corrientes, on the south by the province of Santa Fé and on the west by the provinces of Salta and Santiago del Estero. Its area is 62,000 square miles, and its population about 14,000. The surface is even, but sparsely watered. The southern part is slightly higher and is covered with heavy forests of trees, the wood of which is of great economic value. Its capital is Resistencia, on the right bank of the Paraná River, with a population of 3,500. The districts near the river are inhabited by civilized people, who cultivate the soil or exploit the forests, while Indians roam in the interior. The national government has encouraged immigration by selling land to settlers at the average price of 31 cents for an acre.

CHACO, El Gran, that great, low-lying, alluvial plain situated in the interior of South America and bounded on the east by the rivers Paraná and Paraguay, and on the south and west by the Argentine provinces and the republic of Bolivia. It extends roughly over 10 degrees of latitude and 5 of longitude, comprising an area of about 200,000 square miles. The word Chaco or Chacu is supposed to have signified a drive of wild animals or a hunting ground; but in this instance it was employed figuratively. The region received its name (probably long before the Spanish conquest of Peru) on account of the Inca armies invading these lands. The savage inhabitants, being no match for Inca trained troops, would naturally fly in all directions, like game in a hunting-drive. Politically the great Chaco is under the domination of the republics of Paraguay, Argentina and Bolivia, but with the exception of a fringe of settlements near the boundaries, the

interior is entirely in the hands of Indians, the principal tribes being the Mataccos, Chiriguanas, Tobas, Lenguas, Suhin, Kisapang, Chamacocos and the Bororu. The total population is estimated at 135,000, but it is impossible to speak with accuracy owing to their nomadic habits and the difficulty of obtaining anything like a census. (See the article PARAGUAY). Consult Grubb, W. B., 'An Unknown People in an Unknown Land' (London 1911). The author of that book is recognized in South America as the greatest living authority on the Indians of the Chaco.

CHACORNAC, shä-kôr-näk, **Jean,** French astronomer: b. Lyons, 21 June 1823; d. near there, 20 Sept. 1873. He is principally known for his discoveries of asteroids, which came about in connection with his work on the formation of ecliptic charts of the stars. His asteroid discoveries were six in number, and most of his work was done at the Paris Observatory under Leverrier. He published 'Atlas écliptique' (1856), and 'Atlas des annales de l'Observatoire impérial de Paris' (1860–63).

CHAD, chăd. See TCHAD.

CHADBAND, Rev. Mr., a personage in Dickens' 'Bleak House.' He is a hypocritical minister, who pretends to be humble and to despise the world, but is in reality extremely selfish and self-indulgent.

CHADBOURNE, chăd'bèrn, **Paul Ansel,** American educator and writer: b. North Berwick, Me., 21 Oct. 1823; d. New York, 23 Feb. 1883. He was graduated from Williams College in 1848, and became professor of chemistry and physics there in 1853. He taught the same subjects at Bowdoin and the Berkshire Medical College. He was president of the Massachusetts Agricultural College at Amherst, 1867, and again in 1882; of the University of Wisconsin (1867–70); of Williams College (1872–81). He became very active in politics, served twice in the Massachusetts senate and carried on manufacturing enterprises. He wrote 'Natural Theology' (1867); 'Instinct in Animals and Men' (1872); 'Relation of the Natural Sciences to the Intellect' (1860); and edited *Public Service of the State of New York.*

CHADD'S FORD. See BRANDYWINE CREEK.

CHADRON, Neb., city and county-seat of Dawes County, 350 miles north of Denver, Colo., on the Chicago and Northwestern Railroad. It has a large trade in live stock and is the seat of a State normal school. It contains a Carnegie library, several churches and schools and a public park. The waterworks are the property of the city. Pop. 2,689.

CHADWICK, SIR **Edwin,** English social and sanitary reformer: b. Longsight, near Manchester, 24 Jan. 1800; d. East Sheer, Surrey, 6 July 1890. England is indebted to him for its first sanitary commission, organized in 1838, and the office of registrar-general established through his persistent effort and advocacy. A lawyer by profession, he became private secretary to Jeremy Bentham, was appointed assistant commissioner on the first English Poor Law Commission in 1832, and secretary of the Poor Law Board, an office he held for 20 years. From 1848 to 1854 he was also a commissioner of the Board of Health, when he retired into private life, but kept in close touch with former interests by his numerous contributions on sanitary and economical subjects to periodical literature. He was made K.C.B. in 1889.

CHADWICK, French Ensor, American naval officer: b. Morgantown, W. Va., 29 Feb. 1844. He was graduated at the United States Naval Academy in 1864, some six months before the end of the Civil War; served later in the South Atlantic, Pacific, West Indies and on the European station; was sent abroad in 1882 as naval attaché with general orders covering Europe, though specially attached to the London legation until 1889; commanded *Yorktown* 1889–91; was chief intelligence officer 1892, and in same year was made chief of Bureau of Equipment in the Navy Department. Became a captain in 1897. During the war with Spain he commanded the armored cruiser *New York,* the flagship of the North Atlantic squadron, and was chief-of-staff to Admiral Sampson. Was promoted five numbers for "eminent and conspicuous service in battle." Was president of Naval War College 1900–03; became rear-admiral 1903; commander-in-chief, South Atlantic squadron 1904; retired, by age limit, 1906. Has written and spoken much on public questions; is member Newport Representative Council; of National Institute of Arts and Letters; American and National Geographical societies; corresponding member Massachusetts Historical Society; author 'Temperament, Disease and Health' (1892); 'An Unsolved Problem' (in Congressional procedure, 1896); 'Causes of the Civil War' (Vol. XIX, American National Series, 1906); 'Relations of the United States and Spain'; 'Diplomacy and War' (1909–11); 'The American Navy' (1914).

CHADWICK, George Whitefield, American composer: b. Lowell, Mass., 13 Nov. 1854. He studied under Stephen Emery and Eugene Thayer in America and under Richter, Reinecke, Rheinberger and Jadassohn in Germany, where he went in 1877. On his return to America in 1880 he became organist of Saint John's Church and joined the staff of the New England Conservatory of Music, of which he became director in 1897. From this time his career has been one of ever increasing activity as composer, conductor, organist and teacher, and in the latter capacity he has numbered among his pupils such well-known musicians as Horatio Parker, Arthur Whiting, Wallace Goodrich, Frederick S. Converse and Henry Hadley. As a composer he is regarded by some foreign critics and by many of his countrymen as the leader of the American school. His leaning is toward the highest instrumental forms, which he handles with considerable skill. In 1897 he received the honorary degree of M.A. from Yale University and in 1905 that of LL.D. from Tufts College. His works are: for orchestra — Three symphonies in C minor, B flat and F; six overtures, 'Rip Van Winkle,' 'Thalia,' 'The Miller's Daughter,' 'Melpomene,' 'Adonais' (1899), 'Euterpe' (1904); serenade in F; suite in A; suite sinfonique; for chorus with orchestra—'The Viking's Last Voyage' (1880); 'The Pilgrims' Hymn' (1883); 'Lovely Rosabelle' (1889); 'Phœnix Expirans' (1891);

'The Lily Nymph' (1892); 'Dedication Ode' (1883); 'Columbian Ode' (1892); 'Aphrodite'; 'Tam O'Shanter.' His most ambitious work is a lyric drama, 'Judith' (1900). Two other works for the stage are the comic operas 'Tabasco' (1893), and 'The Quiet Lodging' (1892). He has also written many compositions for piano and organ.

CHADWICK, James Read, American physician: b. Boston, Mass., 2 Nov. 1844; d. 1905. He graduated B.A. at Harvard 1865; M.D. 1871; and pursued further studies abroad. In 1873 he began practice in Boston, and became distinguished as a gynecologist. He was a founder of the American Gynecological Society, its secretary 1876–82, and president 1897. A strong advocate of cremation, he was president of the Massachusetts Cremation Society from 1894 till his death. He contributed many articles on his specialty to the 'Transactions' of the American Gynecological Association, the Boston *Medical and Surgical Journal,* the *American Journal of Obstetrics,* etc.

CHADWICK, John White, American writer and Unitarian clergyman: b. Marblehead, Mass., 19 Oct. 1840; d. Brooklyn, N. Y., 11 Dec. 1904. His radical sermons attracted attention, and he was a liberal contributor to current literature. From 1864 till his death he was pastor of the Second Unitarian Church in Brooklyn, N. Y. Among his works are 'A Book of Poems' (1875); 'The Bible of To-day' (1878); 'Origin and Destiny' (1883); 'A Daring Faith' (1885); 'The Man Jesus'; 'The Faith of Reason'; 'Old and New Unitarian Belief'; 'The Power of an Endless Life'; 'The Revolution of God'; 'Theodore Parker, Preacher and Reformer' (1900); 'George William Curtis'; 'Later Poems' (1905).

CHÆRONEA, kĕr-ō-nē'a, an ancient town in Bœotia, near the Cephissus, on the borders of Phocis, at the head of the last defile where a stand could be made against an invader of central Greece, famous as the scene of several celebrated battles of antiquity. An important battle was fought near it in 447 B.C., by which the Athenians lost the supremacy in Bœotia. A still more celebrated battle was fought 338 B.C., in which Philip of Macedonia defeated the united forces of the Athenians and Bœotians, and crushed the liberties of Greece. A mound of earth, about a mile from the modern village of Kapræna, which occupies the site of the old city, still marks the place where the Thebans who fell in the battle were buried; the grave was also marked by a magnificent colossal lion (quite recently restored). In a third battle, fought at Chæronea, Sulla defeated the generals of Mithridates, 86 B.C. Plutarch was a native of this town.

CHÆTODONTIDÆ. See BUTTERFLY-FISHES.

CHÆTOPODA, kē-tŏp'ō-da, a class belonging to the phylum *Annulata,* characterized by segmentation and the almost invariable possession of bristles (chætæ), usually four bundles to a segment. They comprise the earthworms (q.v.), the leeches, certain fresh-water and numerous marine annelids, such as *Serpula arenicola,* the lobworm and many other genera; the most common and one of the largest American chætopods is the "clamworm" (*Nereis virens*), which is associated with the clam of the New England coast, burrowing deeply in the mud. The marine forms undergo a metamorphosis, hatching as a top-shaped, free-swimming larva, called a trochosphere. Some of the forms, as *Nais, Syllis, Autolycus,* etc., also multiply by a process of self-division called strobilation, and by alternation of generations. Some of them, as *Serpula* and *Spirorbis,* live in solid calcareous tubes or shells. Certain forms are luminous. The tracks of chætopod worms occur in Cambrian strata, which are so much like those made by existing forms as to show that the type has undergone little change since the Cambrian Period, which lies at the very base of the Palæozoic Age. Sometimes practically all the *Annulata* are known as chælopoda. See ANNULATA.

CHAFARINAS, chä-fä-rē'năs, or **ZAFFARINES,** Spain, an archipelago of three islands, off the coast of Morocco, opposite the mouth of the Muluya River, and near the Algerian frontier, three miles north of Capedel Agna. The *Zafran* of the Arabs and the Roman *Tres Insulæ,* they were annexed by Spain in 1848, forestalling by a few days a French expedition sent out for the same purpose. A great land-locked harbor, sheltering the largest ships, has been created by a breakwater uniting the central island Isabella II with El Ray, the near-by islet. Del Congress, the largest of the islands, is rocky and hilly. Pop. 750.

CHAFER, the British name for a scarabeid or dung-beetle. The larger ones, called cockchafers, are very destructive to vegetation, especially in the larval state.

CHAFFEE, Adna Romanza, American soldier: b. Orwell, Ohio, 14 April 1842; d. 1 Nov. 1914. In 1861 he entered the 6th United States Cavalry; was promoted to be first lieutenant in 1865, and in the same year received the brevet of captain for gallant conduct at Dinwiddie Court House. In 1897 he was made lieutenant-colonel, and in 1898 saw service in Cuba during the Spanish-American War, distinguishing himself at El Caney, and was brevetted major-general of volunteers. In 1900 he was sent to take command of the United States forces in China, being promoted to be major-general of volunteers, and took an important part in the expedition against Pekin. In 1901 he was made a major-general in the regular army and in 1902 was placed in command of the division of the Philippines. He was made commander of the Army of the East in 1903, and was chief of staff of the United States Army in 1905, and was retired 1 Feb. 1906.

CHAFFINCH, *Fringilla cœlebs,* a brilliantly colored and well-known European finch, one of the most popular and most valuable cage-birds (q.v.). It is found in large numbers throughout the Continent and England, and is migratory in the more northern parts, remaining, however, in England and around the Mediterranean in winter, where it is shot in great numbers for market purposes. The top of the head and nape of the neck of the male are bluish-gray, the back is chestnut and the black wings are streaked with two conspicuous white bars. It is sought not only because of its loud,

clear and pliable voice, but because of its docility and beauty. Its voice is susceptible to training, and its value greatly increases by cultivation, the wild bird having an unpleasant and almost harsh cry. These birds sometimes have a repertoire of as many as six tunes, the words of which they sing with almost human articulation. Their training and rearing from the nest is an important industry throughout Europe, and particularly in Germany. For a full account of the powers of song of the chaffinch see Bechstein's 'Cage-Birds.'

CHAFIN, Eugene Wilder, American prohibitionist, temperance advocate and Presidential candidate: b. East Troy, Wis., 1 Nov. 1852. He studied law and practised at Waukesha from 1876 to 1900. He was superintendent of the Washingtonian Home, Chicago, from 1901 to 1904. He became known as an eloquent speaker and an active organizer in the temperance and prohibition movements, and was the candidate on these questions selected for several public offices, notably for the governorship of Wisconsin in 1898, and the Presidency of the United States in 1908 and 1912. He was admitted to the bar of the Supreme Court of the United States in 1908. In 1909 he settled in Arizona. His published writings include 'Voters' Handbook' (1876); 'Lives of the Presidents' (1896); 'Lincoln, the Man of Sorrow' (1908); 'Washington as a Statesman' (1909).

CHAGOS, chā'gōs', **ARCHIPELAGO,** a group of islands in the Indian Ocean, nearly on the same meridian as the Laccadives and Maldives, and probably a continuation of them. It extends from lat. 7° 39′ to 4° 44′ S. and long. 70° 50′ to 72° 50′ E. The largest, called Diego Garcia or Great Chagos, 100 miles south of the main group, is about 12½ miles long by 6 broad, is of a crescent shape and consists of a coral atoll covered with cocoa palms, and enclosing a lagoon which forms a harbor four miles broad. Fish abound, and excellent green turtle may be found on the shores. The islands belong to Great Britain, and form a dependency of Mauritius. Cocoanut oil is the chief product. Pigs and poultry are raised in abundance. Pop. 750.

CHAGRES, chā'grąs, a river of Panama rising in the Cordillera de San Blas, flowing southwest, west and northwest into the Caribbean Sea. The mouth of the old river bed is about seven miles west of Colon. The river supplies the water required to operate the locks of the Panama Canal, which follows the bed of the stream from Mindi to Gamboa. The tremendous rise of this river during freshets, as much as 32 feet in 24 hours, presented one of the most formidable engineering problems in connection with the construction of the canal. The building of the Gatun Dam, thereby forming Gatun Lake, successfully solved the problem.

CHAGRES, Panama, a seaport on the north coast of the Isthmus of Panama, at the mouth of a river of the same name. It acquired some importance at one time as the station at which steamers landed the mails for the west coast of America. The terminus of the railroad across the isthmus was, however, in 1855 fixed at Aspinwall (now Colon), about eight miles northeast and Chagres then greatly declined.

CHAILLÉ, shā-yā, **Stanford Emerson,** American physician: b. Natchez, Miss., 9 July 1830; d. New Orleans 1911. He was graduated at Harvard in 1851, and received his M.D at Tulane University in 1853, subsequently studying in Europe for three years. During 1862–63 he was medical inspector of the Confederate army in Tennessee, and later had charge of various military hospitals. He was a member of the National Board of Health, and in 1879 was president of the Havana yellow-fever commission. Since 1858 he held various professorships in Tulane University, Louisiana, and since 1886 was dean of the medical department, and professor of physiology, hygiene and pathological anatomy. He has published 'Yellow Fever in Havana and Cuba'; 'Origin and Progress of Medical Jurisprudence, 1776–1876' (1877); 'Laws of Population and Voters' (1872); 'Living, Dying, Registering and Voting Population of Louisiana, 1868, 1874, 1875'; 'Intimidation of Voters in Louisiana' (1876). From 1857 to 1868 he was coeditor and proprietor of the New Orleans *Medical and Surgical Journal.*

CHAILLE-LONG, Charles, American soldier, explorer and diplomat: b. Princess Anne, Somerset Co., Md., 2 July 1842; d. Virginia Beach, Va., 24 March 1917. He was educated at Washington Academy, 1860, and was graduated from the Columbia Law School in 1880. He enlisted in the Union army in 1862; was promoted captain and mustered out in 1865; appointed lieutenant-colonel in the Egyptian army 1869; chief of staff to General Gordon 1874–77, during which time he concluded a treaty with King M'Tesa annexing Uganda to Egypt; 19 July 1874, discovered Lake Ibrahim and solved the problem of the Nile sources August 1874; was wounded at M'Rooli 17 Aug. 1874; promoted colonel and brigadier, took part in the conquest of the Niam-Niam country, and in the expedition to the east coast of Africa 1875–76, and in August 1877 returned to the United States. Returning to Egypt in 1882, he became acting consul of the United States at Alexandria from June to August 1882, after the massacre of 11 June. He was consul-general and secretary of legation to Korea 1887–89; secretary of the Universal Postal Congress, Washington, May 1897; and chargé d'affairs (October 1897–September 1898) of the special commission to the Paris Exposition 1900. In 1910 he was awarded a gold medal by the American Geographical Society in recognition of his part in the final solution of the problem of the Nile sources. He has published 'Central Africa: Naked Truths of Naked People' (1876); 'L'Afrique Centrale' (1877); 'The Three Prophets' (1884); Les Sources du Nil' (1891); 'L'Egypte et ses Provinces Perdues' (1892); 'La Corée ou Chösen La Terre du Calme Matinal' (1894); and compiled, translated and edited 'Les Combattants Français de la Guerre Américaine 1778–83'; 'My Life in Four Continents' (1912); and contributions to French and American reviews and magazines on Egyptian and African subjects.

CHAILLU, cha-yoó, Paul du. See DU CHAILLU.

CHAIN ARMOR. Called also mail armor, chain mail, or even mail. The term

coat-of-mail (taken from the French *cotte de mailles*) is often, by extension, used to cover the entire (panoply) chain armor — camail, hauberk, chausses, etc. The earliest body defenses started with the Eastern *jazerans* (jackets protected with bronze scales or plates), dating back to very early historic times. The regular chain armor was preceded by body defenses of leather or quilted cloth having metal rings sewn or otherwise fastened to them, the better to protect against blows or cuts. Doubtless chain armor was introduced to Europe from the East, where it was in use in very early times and where it is in use, in places, to this very day. Unfortunately, pieces of chain armor dating, authoritively, earlier than the 14th century are almost unknown. The thinness of the link necessitated by the weightiness of such armor and the very large metal surface exposed to the atmosphere caused rust to annihilate it rapidly unless steadily cared for. The Norsemen (Vikings) used chain armor, as fragments found in their graves testify. Trajan's Column (A.D. 114) shows Roman chain armor (*lorica catenata*) in use similar to that of the 13th century. The *hastati* (spearmen of the first line soldiers of the Roman Republic) appear to have worn armless chain armor reaching to the hips, the second line men (*principes*) also wore chain armor, while the third line (*triarii*) wore a breast plate.

The use of chain armor died out after the fall of the Roman Empire, to be revived by the 11th century, commencing with the hauberk (body armor). By the 12th century the entire mail armor was in use, consisting of head-covering, body armor, leg and foot defense, all in mail. The so-called Bayeux Tapestry depicts the Norman warriors of William the Conqueror (1066) wearing a hauberk in combination with a coif of mail (head defense) over which is worn a conical nasal helmet. (See HELMETS). The hauberk (coat of mail) of the 11th century had short, roomy sleeves, and below was split front and rear to allow easier motion and permit the knight to ride astride his horse. It reached, when standing, somewhat below the knees. The *tunic* (a short linen shirt worn beneath the mail) appears to have become lengthy by the end of the 12th century, reaching to the feet. The tunic disappeared early in the 13th century, being displaced by the *gambeson* (called, also, *gambeis, wambais* and *haketon*), which was quilted. This was worn sometimes by foot soldiers and knights as the sole body defense, or was worn beneath the hauberk to break the impact of blows on the chain armor. The gambeson was long enough to reach the knees and usually shows up (in old illustrations) for a few inches beyond the shorter hauberk. The complete hauberk (or great hauberk) was the privilege of the knight. The cost of a full coat of mail in the early days of that armor was very great, as each ring had to be wrought. Wire drawing was not invented till 1306, by Rudolf of Nuremberg; which discovery reduced the expense of making mail enormously. It brought the shortened hauberk, called *haubergeon*, into the general possession of the men of the line. Over the hauberk was worn the surcoat, or *jupon*, sometimes also termed gambeson when it was *gambised* (quilted).

These surcoats were of rich, costly textile and soon became a background on which to depict the wearer's *cognizance* or device of recognition, so as to be known to other combatants. The surcoat was slit, usually, to permit riding astride the horse. It was sleeveless till the second half of the 13th century, when arm coverings were added. At this period the surcoat reached nearly to the heels. Knights of the 12th century wore mail leg armor (*chausses*), *haut de chausses* covering the entire leg, or *bas de chausses* from the knee down. This leg armor became a kind of armored stocking reaching down over the entire foot by the end of the 13th century. But the common soldier, on account of the great cost of a full suit of mail, wore a swathed leather leg covering, and no coif of mail over the head. In the United States mail sleeves were added to the hauberk. Over the surcoat the sword was belted to the left side. Worn over the coif (or head mail) was either a bassinet or casque. (See HELMETS). The nasal helmet had disappeared by 1140. The close fitting helm (bassinet) followed, and, for battle a *heaume* (pot-helm) placed over it became the popular method. First these heaumes, or great helms, were flat-topped, then some were slightly rounded on top. The conical "sugar loaf" helmet followed (1300).

The shield worn in this period was convex and "kite" or "heater" shaped and was decorated often with the owner's heraldic bearings. See SHIELDS.

A species of armor called "banded mail" seems to have been worn occasionally as early as the end of the 12th century, to become popular by the 13th century. Doubt still surrounds its composition, but illustrations of the period show defined bands (some say leather thongs) passing at intervals over the mail. *Banded* mail appears in engravings as late as the 14th century.

Reinforced Mail Period (1250–1400). Called also "Transition Period," because it, by stages, developed into the Plate Armor Period. Gradually the need for strengthening certain parts of mail seems to have arisen, and we find additions or *reinforcements* appearing.

"Splint armor" appears also early in this period. It consisted of splints of metal covered with and attached to some fabric — as velvet, silk, etc. This was soon evolved into the *brigandine*, which was a corselet of textile with overlapping small metal plates fastened (usually rivetted) to it. The textile was usually worn on the outside, thus exposing the rivets to view.

By the end of the 13th century a *cuir-bouilli* (boiled leather) cuirass was worn over the hauberk. At this time came the *poleynes* or *genouillières*, caps of metal or boiled leather, to protect the knees; also began the practice of using *ailettes* or diminutive shields worn at the shoulders perpendicularly. Next came the leg front plate protection termed *beinbergs*. Then appear disc-plates on the shoulders and elbows. A *rerebrace* plate protection for the upper-arm is strapped over the mail; the *coude*, or *coudière*, plate is fastened to the elbow. The *vambrace* reinforced the mail protecting the front of the lower arm from elbow to wrist. A quilted *upper-pourpoint* is worn over the hauberk and over this again the surcoat.

The coif of mail had already become separate from the hauberk and then disappeared; and a *camail* (neck protector of chain mail) was attached by staples to a conical bassinet (see HELMETS) and overlapped the surcoat. A strap with buckle in the rear held the camail from "riding" up. The lower edge of the hauberk usually continues for about two inches in view lower than the *jupon* — the sleeveless surcoat. Gauntlets with *gadlings* (knuckle points or knobs) arrive in this so-termed "camail and jupon period." (See GAUNTLETS). By the 14th century we find the *solleret* (foot armor) the first laminated plate armor worn by the knights. See SOLLERETS.

By the first half of the 15th century we have come to a time when the knight is found wearing a full harness (panoply) of plate armor with chain mail hauberk beneath and chain camail over neck and shoulders.

The *arbalest* (cross-bow) was introduced in the 12th century to be used for sport as much as war. See CROSS-BOW. See also BARDS, BOWS. CUIRASS, DAGGERS, GAUNTLETS, HELMETS, MACES, SHIELDS, SPURS, SWORDS; also JAPANESE AND ORIENTAL ARMS AND ARMOR.

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CLEMENT W. COUMBE.

CHAIN-BRIDGE. See BRIDGE.

CHAIN-CABLE. See CABLE.

CHAIN-SHOT, a projectile consisting of two balls connected by a bar or chain, formerly used for cutting and destroying the spars and rigging of an enemy's ship. It was invented by Admiral De Witt in 1666, but has long been disused.

CHAIN-SNAKE, a harmless terrestrial snake ranging from the Great Lakes to Mexico. In length it is from four to five feet, the color varying with the species. In the East and South the typical form (*Ophiobolus getulus*) is glossy black, with a chainlike pattern of yellow lines covering its back; the belly is dirty yellow, blotched with black, and the head-plates are black, spotted with yellow. A larger variety, found west of the Mississippi, is "cream-colored, sharply marked with rings of black." Chain-snakes feed upon small mammals, amphibians and reptiles, including venomous serpents.

CHAINE, shăń, **Marius,** French Oriental scholar: b. Tarascon-sur-Rhône, 10 Aug. 1873. He was educated at the Sorbonne School of Higher Studies and at the School of the Louvre, Paris. In 1897 he was ordained to the priesthood and entered the Society of Jesus. He was successively professor of Oriental languages at Saint Joseph's University, Beirut, Syria, the Gregorian University, Rome, and the Pontifical Biblical Institute, Rome. He has written 'L'Egypte et le Sudan' (1902); 'Grammaire éthiopienne' (1907); 'Compendium Morphologiæ Copticæ' (1910); 'Inventaire sommaire des manuscrits éthiopiens de Berlin acquis depuis 1878' (1912); 'Catalogue des manuscrits éthiopiens provenant de la collection Antoine d'Abbadie' (1912); 'Catalogue des manuscrits éthiopiens de la collection Mondon-Vidailhet' (1913); 'Etude sur le texte original des Apophtegmes des Pères d'après le texte grec et le texte copte' (1912); 'Rituel éthiopien' (1913). He contributed articles on Coptic and Ethiopian history and philology to *L'Orient chretien, la Revue Sémitique, Bessarione;* the Arab review, *Al Machriq* of Beirut, 'Nuovo Bolletino di archeologia cristiana' of Rome, and to *Recherches de science religieuse* of Paris.

CHAINS AND CHAIN MAKING. A chain consists of a series of similar links which either interlock or are joined to each other so that they form a continuous flexible metal line. The chain is one of the most familiar as well as one of the most useful of mechanical devices. Its origin is undoubtedly very ancient; remnants of excellent Roman chains may be found in the museums of the world. The uses of chain are many. The

three principal uses are for the hoisting of materials, for the transmission of power and for the conveying of materials. Chains are also used as surveyors' measures, as ornaments, as restraints, as elevator counterweights, for preventing the slipping of motor car wheel and in many other ways too numerous to mention.

All chains may be divided into two general classes which receive their names from the fundamental forms of the links. Coil chains consist of series of links, generally oval in shape, which interlock by passing through one another. Block chains consist, fundamentally, of flat bars which are joined together by cylindrical pins so that the bars are free to articulate about the pins. Coil chains are sometimes loosely called crane chains from the fact that they are generally used in connection with cranes. Block chains are sometimes called link chains, pitch chains and sprocket chains. Coil chains may be subdivided into open link chains, studded link chains, twisted link chains, safety chains, ladder chains and jack chains, while block chains may be subdivided into simple block chains, multiple block (leaf) chains, silent chains, detachable chains and pintle chains. Open link chains are composed of series of interlocking oval links. The links of such chains are generally made from round bars, the size of the chain being taken as the diameter of the bar from which the links are made. The most common example of an open link chain is the ordinary crane hoisting chain. The links of studded link chains are similar to those of open link chain, being provided, in addition, with studs or braces across the centres of the links. These studs strengthen the links, enabling such chains to safely carry loads 20 to 25 per cent in excess of those which may be safely carried by open link chains of the same dimensions. Twisted link chains are made up of links similar to those of open link chains but which have been twisted through an angle of 90 degrees. Safety, ladder and jack chains are of minor importance. The first is made up of small flat links which are stamped from sheet metal; the latter two consist of twisted interlocking wire links. Simple block chains consist of single series of flat bars, each having round holes near its ends, which are joined together by means of pins, rivets or bolts which pass through these holes. The ordinary bicycle chain is, perhaps, the most common example of such a chain. Multiple block chains, or leaf chains, consist of series of flat bars, similar to those which compose simple block chains, which are placed side by side upon the same pins. A chain of this type has the general appearance of a number of bicycle chains joined side by side. Silent chains are of the multiple block type, being made up of series of flat bars which have profiles on one side much like gear teeth in appearance. Chains of this type operate over sprocket wheels which look very much like spur gears. Roller chains are essentially block chains in which the flat bars have been separated to allow of the introduction of a roller between them. Detachable chains are composed of rectangular links which interlock by sliding over one another. This interlocking of the links by sliding over one another eliminates the necessity of using pins for joining the links. Pintle chains are made up of U-shaped links which have barrels at one end and which are joined by means of pins in the form of either rivets or bolts. Chains are generally made of wrought iron, steel or malleable iron. When iron or steel may be subject to excessive corrosion, brass, bronze or some other corrosion-resisting material is used.

Chains as ornaments are generally made of brass, bronze and the precious metals. Chains used as ships' cables and for hoisting are almost exclusively made of wrought iron, for the ductility and toughness of wrought iron, together with its excellent welding properties, make its use desirable despite its comparatively low tensile strength. The iron used is a specially rolled grade, of high tensile strength and great ductility, the object being to secure a chain which, on the application of a sudden stress — as, for instance, when a ship is riding at anchor in a heavy seaway — will stretch and so resist the strain gradually, instead of snapping, as would be liable to happen with material of higher tensile strength but small ductility or power of elongation. The small sizes of coil chain are sometimes made of steel but, in general, such chains are inferior to those made of wrought iron. Simple block chains, multiple block chains and silent chains are usually made of mild steel provided, generally, with hardened steel bushings and pins. One or two types of silent chains are equipped with rocker joints which obviate the necessity of using bushings. Roller chains are made of steel and of malleable iron. Roller chains made of steel are similar in construction to block chains. Those made of malleable iron are generally provided with cast iron rollers. Detachable and pintle chains are made, almost exclusively, of malleable iron because of the peculiar form of the links which makes it economical to cast them, although of late many of the smaller sizes of detachable chain have been made from steel on automatic punching presses. The links of pintle chains are sometimes provided with case hardened renewable bushings. The pins for joining the links of pintle chains are usually steel.

Coil chains of open, studded or twisted link type are usually hand-made. Many of the smaller sizes — up to ⅜-inch — are made on automatic machines, while chains above two inches are made with the aid of power presses and steam hammers. Whether made by hand, by automatic machinery or with the aid of power presses and steam hammers, the same operations are involved. The bar from which the links are to be made is first cut up into pieces long enough to make single links; the ends of each of these pieces are next scarfed and bent so that when the link is formed the scarfed ends will come together; the scarfed piece is next formed into the shape of the finished link; the formed link is then drawn through the last link of the finished chain and its ends are welded. When making studded or twisted link chain, the additional operation of placing the stud or twisting the link is necessary. These operations are generally performed after the link has been welded. The weld is usually located at the end of the link.

In the smaller sizes the whole operation of chain-making by hand is done by a single smith without any helper. The length of completed chain is hung upon a hook or some convenient support near the anvil, and the operation of

forging the link proceeds as follows: In his fire the smith will have two or three short rods of the required diameter, and as one is heated to, say, a cherry red, he withdraws it, cuts off the desired length for one link, gives it a couple of blows to form the welding scarf, bends it through, say, about 130 degrees, hooks it into the end of the completed chain, and brings the ends together for welding. He then raises the link to a welding heat in his fire, places the abutting ends over what is known as the bick-iron, gives it a few taps to ensure a good weld, brings over a "dolly" (which is hinged at the outer end of his anvil and when brought over registers above the bick-iron), and with half a dozen blows on the dolly, accompanied with a dexterous movement of the link, the weld is completed and the link smoothed up to a neat finish. The rapidity with which the smiths do this work is very remarkable. Thus, in the case of a 7/16-inch chain, with 30 links to the yard, an expert smith will cut off from the iron bar, scarf, bend up into shape, and weld the links, at the rate of 18 yards in a day of nine working hours, which is two yards per hour, or one link per minute.

In forging heavy chain two helpers are used, the iron is cut to about one-foot lengths, and several of these are being heated in the fire at the same time. The operation is as follows, the various steps succeeding each other with great rapidity: First, the helper to the right of the anvil withdraws the heated piece, drops one end into an eye at the end of the anvil, and bearing down upon the tongs, bends the piece over to an angle of about 45 degrees. The smith then takes it in his tongs, and with a few taps of the sledge it is bent around. It is heated again, passed through the end of the chain by the smith, laid flat on the anvil and the welding scarfs are put on with a few blows of the sledge. The link is now raised to a welding heat, welded by a few blows by the helpers, laid over the bick-iron, the hinged dolly is brought over, and a few rapid blows on the dolly, while the smith turns the link to and fro, serve to bring the weld up to a smooth finish. The link is now laid on edge; a single blow from the sledge brings it into shape, and with a final tap or two of the smith's hammer the link is finished. At this forge as many as 35 links will be added to a 1¼-inch chain in one hour, or about one every two minutes.

One type of machine making coil chain winds the bar from which the chain is made upon a mandrel in the form of a spiral much similar to a spring. Each loop of the spiral is then cut apart at an angle of 60 degrees so as to form a scarf, and is welded in a set of dies under a drop hammer operated by a workman. Another type of machinery automatically performs all of the operations, including the welding, taking in a plain round bar and turning out a finished, assembly chain. Weldless chains up to one inch have recently been made with some success by passing a red hot cruciform bar through a series of machines. The first operation consists of impressing the outer form of the links on the bar. The second operation cuts away the webs which join the links, and the third breaks the links apart and finishes the chain. Coil chain larger than 2-inch can be made entirely by hand only at a tremendous expense of severe labor and time and it is virtually impracticable to attempt to make such chains without the use of power presses for forming the links and steam hammers for welding them. Chains smaller than 2-inch which are made by hand are generally superior to those made by machinery, while beyond 2-inch machine-made chains, after proper annealing, are by far both stronger and more uniform.

Ladder, jack and similar type weldless chains are made by machines which automatically cut off the wire, form the links, interlock them and twist or bend the ends of the links together. Chains of this type can only be made in small sizes and can be used for only unimportant work such as for horse halters, fences, dog chains and the transmission of hand power. Chains made of precious metal are generally made by machinery in a manner analogous to that used in making iron coil chains, with the exception that the links are either left open or are closed by brazing instead of welding. Very often the links of such chains are stamped and brazed by hand. The operations involved in the manufacture of block chains are few and simple. The bars from which simple and multiple block chains, silent chains and steel roller chains are made are stamped from metal bars of the required width and thickness, the holes for the pins being generally punched while the links are being stamped. In the case of extremely accurate chains, the holes are drilled and the links are finished and polished. The pins of chains of this type are either drop forged, cold rolled or machine turned. The rollers of roller chains intended for light duty are made of pipe or tubing cut to proper length. For severe duty it is necessary to use rollers which are made by boring out solid shafting. Chains of these types are assembled by hand, usually with the assistance of a small power hammer for forming the rivet heads. The links of malleable iron detachable and pintle chains are cast and annealed in the usual manner. After annealing, the links are thoroughly cleaned by tumbling and are then assembled to form the finished chain. Some of the smaller sizes of detachable chain are assembled by machines, all of the larger sizes being assembled by hand. All pintle chains are hand assembled with the aid, when the chain pins are riveted, of small power hammers for upsetting the heads of the rivets. All chains which are to be used for important work are tested after manufacture in order to eliminate the defective links. This is done by subjecting them to test loads well above those under which they are to work and cutting out all links which exhibit defects. Chains which operate over sprocket wheels are also tested for accuracy of pitch and are well oiled and well limbered up before being shipped.

Chains used to hoist materials are generally of the coil type — open link chains being most commonly used. In unusual cases and under peculiar conditions block chains have been used for this work, one notable though disastrous instance being the attempted hoisting, in 1916, of the centre span of the Quebec bridge. Chains used for ship's cables are of either the open link or the studded link type. Chains for this duty have been made from bars as large as four inches in diameter. Chains for

the transmission of power are generally of the simple block, multiple block, roller, silent or pintle types. For low speeds, simple and multiple block and pintle chains are most satisfactory; for medium speeds, roller chains are used; for high speeds, silent chains are usually employed. Small sized coil chains are frequently used for the transmission of hand power. Chains for the conveying of materials are generally of the simple block, roller, detachable or pintle type, although long pitch, open link coil chains were formerly quite extensively and are now sometimes used for this work. Chains which convey materials are generally equipped with attachments which serve to carry buckets, flights, aprons, etc., which actually do the conveying. Block chains for the conveying of materials are made with pins up to three inches diameter and in pitches up to three feet.

Surveyor's chains are open link chains of peculiar construction. The links are relatively long and the ends, instead of being welded, are joined by means of small circular links. A "chain" consists of 100 links, which aggregate 100 feet in the United States and 66 feet in England.

Although each coil chain link consists of two thicknesses of bar, it must not be presumed that a chain possesses double the strength of a single bar; actually there is a reduction of three-tenths in the strength, due to the formation into links, so that the chain has but about seven-tenths of the united strength of two bars of the same diameter of iron. Moreover, as the strength per square inch of a heavy bar is not so great as that of a smaller diameter iron, there is further reduction to be made on this account.

The chain industry is not confined to any one particular country or any one locality. The complete absence of statistics makes it impossible to even approximate its extent.

Technical data on chains may be found in various standard works on machine design and in the following works: 'Machinery's Handbook' (New York 1914); Kent, 'Mechanical Engineers' Pocket Book' (ib. 1916); Marks, 'Mechanical Engineers' Hand Book' (ib. 1916); Year Book of the American Society for Testing Materials (New York).

CHAIR, an article of domestic furniture; a movable seat having four legs, a back and sometimes arms; usually for the accommodation of one person. Chairs were much less common, both with the ancients and in the Middle Ages, than they are in modern times; hence the reason why chair and *cathedra* have retained their appanage of state and dignity. We still speak of the chair of justice, and the chairman of a meeting, and *cathedra* is now most widely known by its derivative cathedral, the name still given to a metropolitan church.

It was not until the 16th century that chairs became at all common. Our knowledge of chairs of antiquity is derived from monuments, sculpture and paintings, and a few examples in the museums. Ancient Egypt developed a splendid type of ebony and ivory, or of carved and gilded wood, covered with costly stuffs, with carved legs of animals or human figures as supports. A chair much of the same type comes from Nineveh. Greek chairs stood up straight; and from the frieze of Parthenon we get the chair of Zeus, a square seat, with a bar back and thick turned legs, ornamented with sphinxes' heads and the claws of beasts. Characteristic Roman chairs were of the same type. The curule chair was like our folding chair, but eventually received a great deal of ornament.

The most famous of all chairs is that of Saint Peter at Rome, which is exhibited only once in a century. It appears to be Byzantine work of the 6th century. It is of wood overlaid with carved ivory, representing the labors of Hercules. Another renowned seat is the 'Chair of Dagobert' in the Louvre. It is of cast bronze, partially gilt, supported on legs terminating in the heads and feet of animals.

For a long time the chair remained the symbol of honor and power. It appeared in all of the houses of the royalty and nobility. This chair soon acquired a high back and arms, and the lower part was usually filled in, with a panelled or elaborately carved front. The seat was hinged and sometimes closed with a key.

In the Renaissance, chairs became common and less architectural, and from this time on varied with the styles of dress and sizes of houses. They gradually became lighter, and took on a more strictly utilitarian character, becoming smaller and more numerous. After the middle of the 17th century, upholstery began to take the place of the leather seat. The heavy chair of the Tudor period gave way to the slender more elegant form improved by Chippendale and later by Adam. In France, the chair of the Louis XVI period had an oval back, ample seat, descending arms and round legs. Its seat was covered in tapestry. The Empire brought in low, squat, unattractive but very comfortable chairs.

Some well-known varieties of the present day chair are the BATH CHAIR, an invalid's chair on wheels, to be pushed along by an attendant, so called from its common use in Bath, England; the FOLDING CHAIR, having seat, legs and back hinged and jointed so that it can be folded up when not in use; ROCKING CHAIR, a seat mounted on rockers; MORRIS CHAIR, a cushioned seat with a hinged cushioned back which can be inclined at various angles. See SEDAN CHAIR.

CHAIR OF SAINT PETER, The, a relic at Rome of which the first known mention was made by Ennodius in 500, and a feast in honor of which was instituted or restored by Paul IV in 1558. It was exposed for public veneration by Pius IX in 1867. It is of wood overlaid with ivory and gold. The name is also used to denote the See of Rome or the office of the papacy, from the tradition that Saint Peter was the first bishop of Rome.

CHAISE, shāz, (1) a two-wheeled carriage for two persons, with a calash top, and usually drawn by one horse. (2) A French gold coin issued by Louis IX in the 13th century. It was equal to about three gold dollars in the United States. It took its name from the representation of the seated king on the face of the coin. Chaises were also coined in England in the reign of Edward III.

CHALCEDON, kăl-sē'dŏn, a city of ancient Bithynia, opposite Byzantium, at the entrance of the Euxine, about two miles south of

the present site of Scutari. Chalcedon is said to have been founded before Byzantium, about 677 B.C. by a colony from Megara. It flourished in trade and finally joined the Athenian League when the Greek cities freed themselves from Persian rule. The Spartans won it during the Peloponnesian War. It was a flourishing town when it came into possession of the Romans, under the testament of Nicomedes 74 B.C., as included in the kingdom of Bithynia. In the war against Mithridates the Romans had fled to Chalcedon to escape Mithridates, who followed them, destroyed the protection of the port, burned four ships and captured the remainder. It was captured by Chosroës II of Persia in 616 A.D. after which it was finally destroyed by the Turks, by whom it was taken about 1075.

At Chalcedon in 451, Marcian, the Emperor of the East, held the fourth general council for the purpose of destroying the ascendancy of the Monophysite doctrines obtained in 449 by the influence of the Alexandrian patriarch Dioscuros at the (so-called) robber-synod at Ephesus; and define the Christian faith so as to guard its orthodoxy against the Nestorian and Monophysite heresies. The council opened on 8 Nov. 451 under the guidance of Paschasinus, the bishop deputed by Leo I. About 600 bishops, mostly from the East, were present. It deposed Dioscuros, and after violent debates the articles of faith settled by them declared, in opposition to the Monophysites, the belief of two natures in Christ, existing without mixture or change, without division or separation, so that by the union of the two natures in one person and substance their distinction is not destroyed, but the characteristics of each are retained. Besides this creed the council promulgated 30 canons against clerical abuses, of which canons the 28th conceded to the See of Constantinople second rights and privileges to the Roman, but Pope Leo I refused to confirm it. Rebellions in Palestine and Egypt were the immediate consequences of the decrees of the council of Chalcedon against Dioscuros and the Monophysites; and not till after a long period of ecclesiastical contests did the Chalcedon formula of faith obtain the undisputed authority which it now has in the Catholic, Greek and many Protestant churches.

CHALCEDONY (from Chalcedon, an ancient Greek town in Asia Minor), a cryptocrystalline variety of quartz, transparent or translucent, with a waxy lustre, and white, gray, blue, brown or black in color, but commonly of a tint suggestive of diluted milk, marked with veins, circles or spots. It occurs in masses, also very frequently in mammillary, botryoidal and stalactitic forms. It is used for ornament and is often called "white agate." There are several varieties, as common chalcedony, chrysoprase, sard and sardonyx.

CHALCEDONYX, the name applied to those agates in which opaque white chalcedony alternates with the translucent gray variety.

CHALCIS, kăl'sĭs, Greece, town and capital of the island of Negropont or Eubœa, at the junction of the Talanta and Egripos channels. The latter is narrowed to 85 feet at Chalcis by a rock, surmounted by a castle, partly of Venetian, partly of Turkish, origin. A stone bridge crosses here. The main channel, 120 feet wide, was once crossed by a drawbridge, which has been removed in clearing and widening the channel for larger vessels. The modern town is now one of the most attractive in Greece, and consists of an inner walled town and an outer or suburban portion, the walls being the work of the Venetians. In the inner town the streets are narrow and the houses lofty. Several of the churches were formerly mosques. Ancient Chalcis was one of the greatest of the Ionic cities, carried on a large trade and planted numerous colonies. It had also colonies on the coast of Macedonia and Italy, in Sicily and in the islands of the Ægean Sea. The Chalcians joined the Bœotians in a war with Athens, in which they were defeated 506 B.C. After the Persian wars Chalcis became tributary to Athens. The Chalcians revolted 445 B.C., along with the Eubœans, but were vanquished by Pericles. Another revolt occurred 411 B.C., and Chalcis for a short time became independent. A bridge was at this time built across the Euripus, and fortified, a passage sufficient for a single ship being left in the middle. It was subsequently occupied by the Macedonians, and after various vicissitudes fell under the yoke of the Romans. It became a place of great military importance, was nearly nine miles in circumference, and contained several temples, theatres and public buildings. Chalcis was the birthplace of the orator Isæus and the poet Lycophron and Aristotle died there. Chalcis joined the Achæans in their last war with Rome, when the city was taken and destroyed by Mummius. It was afterward rebuilt, and about the beginning of the Christian era was the chief city of Eubœa. It was held by the Venetians from 1210 to 1470, when it was taken by the Turks. Pop. about 10,000.

CHALCIS, FLIES, a family (*Chalcididæ*) of parasitic *Hymenoptera,* allied to the ichneumon flies, and with similar habits. The fore wings are nearly veinless; the posterior margin of the prothorax not reaching the tegulæ; while the ovipositor issues from before the end of the abdomen. The chalcids are generally minute, a few almost miscroscopic, most of them black, with metallic reflections. A goodly proportion of them are secondary parasites, that is, are parasitic on other chalcids; some deposit their eggs in galls. Typical genera are *Pteromalus* (*P. puparum*), *Semiotellus* and *Chalcis. Isosoma hordei* is the wheat jointworm, which is not carnivorous or parasitic in other insects. Our largest chalcid is *Leucospis affinis.* Aside from the immense benefit these chalcid flies confer on agriculture by destroying noxious caterpillars, etc., the fig insect (*Blastophaga grossorum*) is the agent in enhancing the value and flavor of figs. See CAPRIFICATION.

CHALCOCITE, kăl'kō-sīt (*χαλκός,* "copper"), a native sulphide of copper having the formula Cu_2S. It crystallizes in the orthorhombic system, and also occurs in massive and granular forms. It has a hardness of from 2.5 to 3, and a specific gravity of from 5.5 to 5.8. It is opaque and leaden in color, with a metallic lustre. In the United States it occurs in crystals at Bristol, Conn., massive as the principal copper ore at Butte, Mont., and similarly in many copper mines in Arizona; also in Mexico, Chile and Peru. Beautiful crystals come from

Cornwall, England, and one crystal, found in Tuscany, weighs half a pound. It contains 80 per cent of copper and is known also as "copper-glance," "chalcosin" and "redruthite."

CHALCONDYLAS, kăl-kŏn'dĭ-lăs, **Demetrius,** Greek grammarian: b. Athens about 1424; d. Milan 1511. He was a pupil of Theodore Gaza, and on the taking of Constantinople by the Turks came to Italy, where he taught the Greek language, was invited to Florence by Lorenzo di Medici about 1479, and proceeded afterward, on the invitation of Ludovico Sforza, to Milan. He spread the study of the Greek language and literature in the west of Europe, and sent out several celebrated scholars. Among the works edited by him are 'Homer' (1488); 'Isocrates' (1493) and 'Suidas' (1499). He also compiled a Greek grammar, which was long in general use as a schoolbook. In his editions of the Greek authors he was somewhat arbitrary in his emendations of the text. His brother Laonicus, after witnessing the fall of Constantinople, followed his brother to Italy. He is the author of a history of the last years of the Byzantine empire, from 1297 to 1462.

CHALCONDYLAS, Laonicus, Greek historian: b. Athens; d. about 1464. He was a brother of Demetrius Chalcondylas (q.v.). He was an ambassador of John VII during the siege of Constantinople, and wrote a 'History of the Byzantine Empire 1297–1462.'

CHALCOPYRITE, kăl-kō-pī'rīt (Gr. *χαλκός,* "copper" pyrites), a native sulphide of copper and iron, having the formulas $Cu_2S.Fe_2S_3$, and crystallizing in the tetragonal system, commonly with a tetrahedral aspect. Chalcopyrite is brass-like in appearance, and is often tarnished and iridescent. It has a specific gravity of about 4.2, and a hardness of from 3.5 to 4. It is widely distributed, and in Cornwall, England, it constitutes the chief ore of copper. It occurs in many parts of the United States also. Owing to the iridescence noted above, it is often called "peacock ore." It is softer and deeper in color than ordinary iron pyrites, with which it is sometimes confused.

CHALDÆA, kăl-dē'ą, in ancient geography, the southerly part of Babylonia (q.v.), toward Arabia and the Persian Gulf, lying west of the mouth of the Tigris and Euphrates. The Chaldæans are supposed to have been at first a wandering and predatory race like the Arabs, who afterward became settled, and ultimately gave their name to Babylon and the Babylonian empire. The name Chaldæan was especially applied to a portion of the Babylonian Magi, who were devoted to the pursuit of astronomy and magical science.

CHALDÆAN, CHRISTIANS, kăl-dē'ąn, a branch of the Nestorians, in communion with the Roman Catholic Church. The patriarch is directly subject to the Propaganda, is an archbishop, and the priests, who are very poor, number 108. In all essentials of doctrine and morals the Chaldæan Christians are in perfect conformity to the Catholic Church, but the clergy are permitted to marry before taking the higher orders, and not a few customs and rites of the Nestorians are found among them. About 40 monks in the monastery of Mar Jurgis follow the rule of Saint Anthony. In 1826 the Chaldæan Christians numbered 120,000, but in consequence of wars, famines and Kurdish cruelty, the present population is about 40,000.

CHALDEAN MS., The, a skit at the expense of the publisher Constable, and of the Edinburgh notables specially interested in the Whig *Edinburgh Review;* prepared by the editors for the seventh number of the new Tory *Blackwood's Magazine,* October 1817. In form it was a biblical narrative in four chapters, attacking Constable, and was perpetrated by James Hogg, the "Ettrick Shepherd," whose original paper was greatly enlarged and modified by Wilson ("Christopher North") and Lockhart.

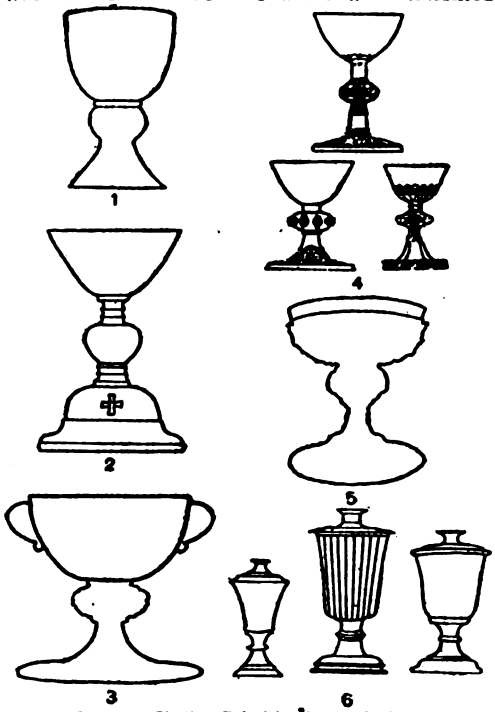
CHALDEE, LANGUAGE, kăl'dē, a form or dialect of the Babylonian and also of the Aramean, one of the three principal varieties of the ancient Semitic. The region called in Scripture Aram may be described generally as occupying the northern and northeastern divisions of that corner of Asia which was the home of the Semitic languages. It was bounded on the north by the Taurus Range and the river Tigris, which latter also formed its eastern boundary; on the west by the Mediterranean and Mount Lebanon; and on the south by Palestine and the Arabian desert. The Aramean language was very extensively known, not only within the limits above mentioned, but beyond them. The princes of Judea and Assyria were familiar with it; it was spoken in the palace of Nebuchadnezzar, and even formed the medium of communication between the Persian court and its subjects in Judea and Samaria. It may also lay claim to a high antiquity, being probably the language of Abraham previous to his migration into Palestine, and certainly of his grand-nephew Laban. Unfortunately the older monuments of the language have perished, the Chaldee portions of Daniel and Ezra being the earliest specimens we possess of a language which had probably existed and flourished at least 2,000 years before. There is another dialect of the Aramean besides the Chaldee, namely, the Syriac, and in this as well as in the Chaldee numerous writings are still extant, but they are all of comparatively recent date. The Chaldee literature is usually arranged in two divisions: the biblical Chaldee, or those portions of the Old Testament which are written in Chaldee, namely, Daniel from ii, 4 to vii, 28; Ezra iv, 8 to vi, 18 and vii, 12–26; and Jeremiah x, 11; and the Chaldee of the Targums and other later Jewish writings. The former is distinguished by a closer approach to the Hebrew idiom, and is therefore considered less pure than the Chaldee of the Targum of Onkelos, the oldest and most valuable of the Targums. Consult Brinton, 'Protohistoric Ethnography of Western Asia' (Philadelphia 1895); Delattre, "Les Chaldéens" in 'Revue des questions historiques' (Paris 1896); Meyer, Edward, 'Geschichte des Altertums' (3d ed., Leipzig 1913); Winckler, 'Untersuchungen zur altorientalischen Geschichte' (Leipzig 1889).

CHÂLET, shă-lā' ("a little castle"), the wooden hut of the Swiss mountain herdsman; a French-Swiss name, which is also extended to Swiss houses generally, as well as to ornate and picturesque villas built in similar style.

CHALEUR BAY, shą-lêr, or **BAY OF CHALEURS,** an inlet or arm of the sea in the

Gulf of Saint Lawrence, between Quebec and New Brunswick. It is about 85 miles in length from east to west and has a maximum width of over 20 miles. Its depth is 250 feet. The French fleet was here defeated by the British in 1760. There are a number of islands in this bay, notably Shippegan, near its mouth. The navigation is good and the mackerel fishery is important.

CHALICE. The ecclesiastical cup in which the consecrated wine is administered at the ceremony of sacrament. The early Christians used plain glass chalices at first, then they became decorated with goldleaf. Wood is said by some to have been the very first material used. With the advance from severe poverty the Church made the vessel in successive stages from horn, then ivory, and, with wealth at disposal, the precious metals were utilized; bone chalices were used in Germany, which material was forbidden in 787. Chalices were classified



1. 1st Century Chalice, Primitive Form, in Monastery of Kremensmünster. 2. Sepulchral Cup (1084). Münster Brass, Unornamented. 3. Ministerial Chalice with Handles. 4. Three Gothic Chalices, 14th Century, So. Ken. Museum. 5. Saint Remigius Cup. Late Romanesque. 6. Post Reformation Chalice with Paten Covers (1) 1563–64; (2) Early 18th Century; (3) Recent.

by the clergy as *ministeriales* (used for distributing the wine), *offertorii* (used by the deacons for offering the wine to the faithful), *majores* and *minores* (according to their respective sizes). The first of these usually had handles (*calices ansati*), as they were very large and heavy. The ecclesiastical chalice is made up of three parts: the cup or bowl; the stem with its middle swelled into a bulb or other kind of protuberance (termed a *knop*) to hinder its slipping when held; and the foot. In very early times the paten was considered as an integral part in the term chalice.

The first form of chalice would appear to have been the Grecian cantharus shape, if we notice the altar depictions of the 6th to 9th century. Next appeared a similar form to that of the present day, but much larger. An example of the great size some of these ancient altarpieces attained is shown in the statement that Charlemagne (742–814) presented Saint Peter's at Rome with a pure gold chalice weighing 53 pounds. They became smaller after the 12th century, losing their handles and the bowl becoming conical or semi-ovoid. The distribution of the wine from the large chalices was made through the medium of a small pipe (*fistula* or *calamus*) of gold, silver or ivory, and which was furnished with one or several handles. Examples of these are still extant. Chalices may also be divided into the following classes: Pontifical handsome chalices for use on festive occasions; those used at common mass; *traveling* chalices for visiting distant places—usually small and frequently in parts that could be separated and packed in a small compass; funeral chalices, generally of lead or other common metal for burial with bishops. Cripps (noted authority) divides chalices into their respective periods thus: (1) Norman type (circa 1170–1350), with circular feet. (2) Gothic type (circa 1350–1510), with hexagonal feet; bowls conical at first, then less so. From 1490–1510, feet with *toes*. (3) Tudor type (circa 1510–36), with six-lobed and flowing feet; bowls often less conical. From 1525 to 1536, bowls nearly hemispherical; feet with flowing outline.

Octavius Morgan tells us the feet were made out of the round (usually hexagonal) to prevent the chalice from rolling when laid upon its side to drain. Fine enamel and chased work usually appear on the knop, stem and foot, frequently representing emblems of the Passion or other sacred subjects. The bowl is, generally, quite plain and highly polished, so as to be easily kept clean. A cross also appeared on one side, which the officiating priest kept facing him. A fair impression of the prevailing chalice forms in the different periods (including the heavy post-Reformation vessels) can be gained from the accompanying outlines.

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CLEMENT W. COUMBE.

CHALICOTHERE, a mammal of the extinct, ancylopod family, *Chalicotheriidæ*, fossil in various parts of the northern hemisphere from the Eocene Epoch onward; the type disappeared toward the close of the Miocene Epoch in America and in Europe, but persisted in southern Asia, at least, into Pleistocene. Among the better known genera are *Pernatherium, Moropus, Macrotherium, Chalicotherium* and *Ancylotherium*. They were small, deer-like, forest-dwelling animals, perhaps resembling ponies in form, and with teeth of a hoofed

animal but long-burrowing claws like those of a rodent. Scott ('Land Mammals in the Western Hemisphere,' New York 1913) says: "*Moropus*, the lower Miocene genus (of North America) was as grotesque a creature as could well be imagined. . . . With rather a small and somewhat horse-like head, long neck, long fore limbs and shorter hind limbs, three-toed feet, which were armed with enormous claws." The problem of their habits and mode of life is still unsolved, but it is inferred that they fed chiefly on leaves.

CHALIER, Joseph, French revolutionist: b. Lyons 1747; d. there 1793. Educated for the Church, instead, he engaged in business, and as traveler for a Lyons firm visited Spain, Portugal and Italy. At the outbreak of the French Revolution in 1789, he was in Paris and associated with Robespierre, Marat and Desmoulins. Returning to Lyons he became the first member of the municipal bureau, and led in the civic reorganization that ensued, his administration being approved when assailed in the Legislative Assembly. Defeated by a royalist in an election for mayor of Lyons in 1792, Chalier became a leader of the local Jacobins, and in 1793 precipitated a conflict which ended in his arrest and his execution, notwithstanding stay proceedings of the Convention, his memory as "a martyr of liberty" surviving. Consult Wahl, N., 'Les Premières Années de la Revolution à Lyon' (Paris 1894).

CHALK. In geology chalk is a soft, friable, finely granular variety of limestone or carbonate of lime, and may in color range from pure white to grayish or buff. It is a marine deposit, composed principally of the shells of foraminifera. In the United States are some great beds of chalk of Upper Cretaceous Age. One is exposed for 250 miles from Austin to Sherman, Tex., and is nowhere much less than 600 feet thick. Chalk beds of the same age, Colorado stage, are found in Arkansas, Kansas and in Montana, while the great chalk belt of Texas extends southwest from Austin into Mexico, being found in the states of Chihuahua, Coahuila and Tamaulipas. In Arkansas and Texas this chalk formation and its associated chalky marls is being developed as furnishing excellent material for making Portlant cement. No statistics of the amount thus used at present are available. In England the Upper Cretaceous series is marked by great beds of chalk and chalky limestones, and includes the Cenomanian, Turomain and Senonian stages. Such strata extend across England from Flamborough Head on the east coast to west of Dover on the south coast. The chalk-mining industry of England is of importance, the total amount of chalk produced being about 4,500,000 tons annually. Part was used for cement-making and part for making refined chalk. When freed from grit by washing, it is called whiting, and is used for cleaning silver and making putty. When mixed with some binding substance it is used as a marking material. It is also used in farming to improve the texture of the soil. When purified it is also used to allay acidity of the stomach. (See CEMENT; CRETACEOUS SYSTEM; LIME.) Consult 'United States Geological Survey Report, 1900–01,' Part III; 'The Chalk of Northwestern Arkansas.'

CHALK, Red, or **REDDLE,** a red, amorphous variety of hematite or sesqui-oxide of iron, containing much clay. To this fact it owes its firm, compact texture. It has an ochre-red color and is used chiefly by carpenters for making marks on wood, and by tailors for marking on cloth; the finer, by painters. It occurs in thin beds in clay-slate and gray wacke-slate in parts of Germany.

CHALKLEY, châk'lĭ, **Thomas,** American Quaker itinerant preacher: b. London, 3 March 1675; d. Tortola, West Indies, 4 Sept. 1741. He spent his life preaching in New England and the Southern colonies; toward its end he made his home near Philadelphia. His chief work was his 'Life, Labors and Travels,' whose quaintness made it popular even outside the Society of Friends, and has caused it to be several times reprinted.

CHALLEMEL-LACOUR, shăl-mĕl-lä-koor, **Paul Armand,** French statesman: b. Avranches, 19 May 1827; d. Paris, 26 Oct. 1896. He was graduated at the École Normale in 1849, became a professor in the schools of Pau and Limoges, and soon fell under the ban of political proscription. He withdrew to Belgium and then to Switzerland, where he became a teacher of French literature at Zürich. He contributed largely to the *Revues* on his return to France in 1859, and after peace was reinstated gained the entire confidence of the Republic. He was elected to the French Chambers, however, and served the Republic as senator, Ambassador to Switzerland from 1874 to 1879, Ambassador to England from 1880 to 1882, Minister of Foreign Affairs and president of the Senate in 1888. He was elected to the French Academy in 1893.

CHALLENGE, originally, an accusation, charge or claim. A challenge to jurors is an objection either to the whole panel or array, that is, the whole body of jurors returned, or to the polls, that is, to the jurors individually; and it is either peremptory, that is, without assigning any reason, or for cause assigned. A peremptory challenge is allowed to be made only by the party accused, and not by the government or prosecuting officer, and only in capital cases; and is said to be permitted on the ground that a man is liable to conceive a prejudice against another from his mere looks and appearance, for which he can give no reason: and such may be the case of the accused; and it is conceded, in favor of life, that in such case he may exclude the juror without assigning any reason; and also on the ground that, by questioning a juror as to any objection to him, his prejudice may be excited thereby against the prisoner, who, to save himself from the effect of such prejudice, is permitted to have him rejected. The ground on which peremptory challenge is allowed supposes the prisoner's life to be in danger, and he is not entitled to it if he pleads in bar or abatement, for the trial of these pleas does not decide on his life. He must, before making such challenge, plead "not guilty," or some plea the trial of which decides on his life. Having pleaded such a plea, the accused might, by the common law, peremptorily challenge 35 jurors; but the statute 22 Hen. VIII c. 14 limited the number to 20 in felony. The regulating statute now in force in Great Britain is 6 Geo. IV c. 1. By the law of the United States a peremptory challenge of 35 jurors is allowed in trials for trea-

son, and 20 in those cases of felony mentioned in the statute. A challenge of the whole panel may be made because the jury is illegally drawn or summoned, whereby it is not a legal jury; and a challenge of this description may be made by the government as well as by the prisoner. Challenge to the polls may be made both in civil and criminal suits for cause, as that the juror is an alien, not from the proper district, not duly qualified as a freeholder, not of suitable age, etc., or is near of kin to one of the parties, is biased, has been guilty of felony, is interested, or is subject to any other exception, according to the common principles of proceeding or the provisions of any statute on the subject. In courts-martial a prisoner who objects to either of the judges must assign his reasons. In other words peremptory challenges are not allowed in these courts. The privilege of challenging here belongs equally to the prisoner and the prosecutor. The right of challenging the member of a court-martial prevails on the continent of Europe, as well as in England and America.

A challenge to fight a duel is punishable in England with fine and imprisonment. The tendency of modern statutes in the United States is to subject all persons connected with a challenge to serve criminal punishment, and to declare their ineligibility to any public office, either for life or for a limited term. See DUEL.

CHALLENGER EXPEDITION, an expedition conducted in 1872–76, under the auspices of the British government, for the purpose of exploring the open ocean. The *Challenger* was fitted with everything that could be carried in the way of appliances for scientific research, and placed in command of Captain Nares. Prof. Wyville Thomson and scientific staff conducted the investigations and determined the depth of waters, the configuration and conditions of sea-floor, the fauna, the currents, atmospheric conditions, etc. During the three and a half years they covered nearly 70,000 nautical miles. The route was south to Madeira, thence to the Canaries, the West Indies and north as far as Nova Scotia; south again to Cape Verde, then to Cape of Good Hope, Australia, the China Sea, Japan, the west coast of South America, through the Straits of Magellan and back to England. The narrative of the expedition is told in popular form in Moseley's 'A Naturalist on the Challenger.' A complete account of the scientific results was gradually published in 50 splendid volumes, by Wyville Thomson and Dr. John Murray.

CHALLIS, James, English astronomer: b. Braintree, Essex, 12 Dec. 1803; d. Cambridge, 3 Dec. 1882. In 1836 he was elected Plumian professor of astronomy at Cambridge and director of the observatory. In 1861 he was succeeded in the latter position by Adams, but retained the professorship of astronomy till his death. He is best known for his work upon the theory of astronomical instruments, and for his observations in connection with the discovery of the planet Neptune. His inventions include the collimating eyepiece, the transit reducer and the meteoroscope. He contributed about 225 essays to publications and in addition several independent works on astronomy, mathematics and physics.

CHALLONER, Richard, English Roman Catholic bishop: b. Lewes, England, 29 Sept. 1691; d. London, 12 Jan. 1781. His parents were Protestant dissenters from the established religion of England. After the death of his father young Challoner came under other influences and was received into the Catholic Church. At the age of 13 years he entered the English college at Douai in France and there, after completing his studies, was ordained priest and appointed professor of divinity. He remained in this station till 1730, when he was sent on the English mission with London as his field. He wrote many controversial tractates and many devotional manuals. Among his writings is 'The Catholic Christian Instructed,' a sort of advance catechism of the Roman Catholic faith, in the preface to which he made an ingenious and spirited reply to Dr. Middleton's famous 'Letter from Rome, Showing an Exact Conformity Between Popery and Paganism.' Middleton, smarting from the keenness of Challoner's controversial weapons, invoked against his adversary the penalties prescribed by the penal laws enacted for the extermination of the Roman Catholic religion. In 1741 Challoner was consecrated bishop and made coadjutor to the bishop in charge of the "London District," for the assumption of a see-title in England by a Roman Catholic bishop was a penal offense. Besides the work already mentioned, Challoner wrote the devotional work, 'Garden of the Soul,' which is still in general use among Roman Catholics as a prayer-book. He wrote also, in two volumes, 'Memoirs of Missionary Priests and Other Catholics of both Sexes Who Suffered Death or Imprisonment in England on Account of Their Religion, from the Year 1577 till the End of the Reign of Charles II'; also 'Britannia Sancta,' lives of English, Scotch and Irish saints. He revised the Douai-Rheims English version of the Old and New Testaments, improving and modernizing the style. For his 'Life,' consult Barnard (1784) and Burton (London 1909).

CHALMERS, Alexander, Scottish journalist, editor and miscellaneous writer: b. Aberdeen, 29 March 1759; d. London, 10 Dec. 1834. His father was the founder of the first Aberdeen newspaper. He received a good classical and medical education in his native city. About 1777 Chalmers went to London, and was employed as a contributor to the *Saint James' Chronicle*, the *Morning Chronicle*, the *Morning Herald* and various critical magazines and reviews. He edited numerous editions of the English classics, particularly the 'British Essayist' (45 vols., 12mo, 1803), commencing with the 'Tatler,' and ending with the 'Observer,' together with prefaces, histories and biographies; the 'Spectator'; 'Tatler'; and 'Guardian' (12 vols., 8vo, 1822); an edition of Shakespeare, with historical and explanatory notes, in 1809; 'The English Poets from Chaucer to Cowper,' with Johnson's 'Lives,' and additional 'Lives' by Chalmers (21 vols., royal 8vo, 1810). The most important and valuable of Chalmers' extensive literary labors, however, was the 'General Biographical Dictionary' (32 vols., 8vo, 1812–17), the fullest body of biographical information published up to his time in England, and which has rendered invaluable service to subsequent compilers.

CHALMERS, George, Scottish antiquary: b. Fochabers, Elginshire, 1742; d. 31 May 1825. Having studied law at Edinburgh, he removed to America in 1763, where he practised that profession for upward of 10 years, till the colonies declared themselves independent. Chalmers, being a keen Loyalist, returned to Great Britain, where he was in 1786 appointed to the office of clerk of the Board of Trade. Previous to his appointment he had published 'Political Annals of the United Colonies' (1780); 'Estimate of the Comparative Strength of Great Britain During the Present and Four Preceding Reigns' (1782); and 'Opinions on Interesting Subjects of Public Law and Commercial Policy, Arising from American Independence' (1784). In 1790 he published a biography of Daniel Defoe; in 1794 a biography of Thomas Ruddiman; in 1800 he edited the works of Allan Ramsay, with an elaborate memoir of the poet; in 1805 the works of Sir James Stewart of Coltness, also with a life prefixed; and in 1806 the writings of Sir David Lindsay of the Mount. The first volume of his 'Caledonia' (1807), in quarto, displayed a vast extent of erudition and research. It professes to be an account, historical and topographical, of North Britain, from the most ancient to the present times; and the original intention of the author was, that it should be completed in four volumes 4to, each containing nearly 1,000 pages. Chalmers left the remainder of his great work nearly ready for the press; and it was subsequently published complete, with numerous annotations. He also wrote a 'Chronological Account of Commerce and Coinage in Great Britain' (1810). Throughout he displays profound research into the history of Scotland and is still considered authoritative.

CHALMERS, George Paul, Scottish painter: b. Montrose 1836; d. Edinburgh, 28 Feb. 1878. After serving in succession under a surgeon and a ship chandler, he went to Edinburgh in 1853 in order to become an artist. He was elected an associate of the Royal Scottish Academy in 1867, and four years later was elected to full membership. His pictures, which are characterized by rich coloring, consist mainly of portraits and subjects, though during his later years he produced several landscapes. The most important are the 'Favorite Air' (1864); 'End of the Harvest' (1873); 'Running Water' (1875); 'Threescore Years and Ten' (1875); 'Prayer' (1876); 'Knitting' (1876); and 'The Legend' (unfinished). Consult his biography by Pinnington (Glasgow 1897); and Caw, 'Scottish Painting' (Edinburgh 1908).

CHALMERS, James, Scottish missionary: b. Ardrishaig, Argyll, 1841; d. Goaribari Island, 8 April 1901. After early mission service in Glasgow, he was accepted by the London Missionary Society and was appointed in 1866 to Raraborya in the South Pacific where the natives named him "Tamate" the "well known." After 10 years' enthusiastic missionary work he was transferred to New Guinea. In 1901, with a brother missionary, Rev. Oliver Tompkins, he was killed by cannibals at Goaribari Island. His character and work were the source of cordial appreciation on the part of R. L. Stevenson. Consult Lovett, R., 'Tamate: Autobiography and Letters of James Chalmers' (1902).

CHALMERS, Thomas, Scottish theologian: b. Anstruther Easter, Fifeshire, 17 March 1780; d. Edinburgh, 30 May 1847. At the age of 12 he was sent to the University of Saint Andrews, for the purpose of studying for the Church, and after passing through a curriculum there seven years, was licensed as a preacher in July 1799, the rule of the Scottish Church requiring that a licentiate shall have reached the age of 21 being dispensed with in his case, in virtue of the exceptional clause in favor of those possessing "rare and singular qualities."

In May 1803 he was presented to the parish of Kilmany, in the northeast of Fifeshire, and opened classes of his own for teaching mathematics in the town of Saint Andrews. These were so successful that he commenced a class in chemistry also, his lectures on and demonstrations in which created quite a sensation. About this time his views as to the obligations of a Christian pastor were very different from what he was subsequently led to entertain, and he deemed it a sufficient fulfilment of these to return to Kilmany on the Saturday evenings, and from thence back to Saint Andrews on the Monday mornings, devoting the bulk of his time to scientific pursuits. In 1808 he published an 'Inquiry into the Extent and Stability of National Resources,' the object of which was to show that the Berlin decree would not touch the real foundations of the prosperity of Great Britain. Illness and bereavement among other causes led in 1810 to a spiritual revitalizing of his own life, and from this time may be dated his extraordinary hold on the moral and religious life of Scotland.

In 1813 his article on Christianity appeared in the Edinburgh 'Encyclopædia,' and shortly afterward his review of Cuvier's 'Essay on the Theory of the Earth,' in the *Christian Instructor*. In this last he propounded the interpretation of the first verses of Genesis, afterward adopted by Dr. Buckland, with a view to make the truths of revelation and the discoveries of geological science harmonize. His fame as a preacher had by this time extended itself throughout Scotland, and a vacancy having occurred in the Tron Church of Glasgow, he was elected to the charge by the town council, and inducted on 21 July 1815. In the month of November following he commenced his series of astronomical discourses, in accordance with a custom observed in Glasgow, of the city ministers delivering in rotation a course of sermons in the Tron Church on Thursdays. These created a sensation such as no sermons had ever before produced in Glasgow. It is related, that when the hour of delivering them arrived, merchants and men of business would regularly leave their desks and proceed to the Tron Church, while the more liberal among them would, in addition, grant a similar indulgence to their clerks and assistants. In the commencement of 1817 these discourses were published, and attained a sale of nearly 20,000 copies by the end of the year. They raised their author to the position of the first preacher of the day, and in a visit which he shortly afterward paid to London, the most distinguished literati and statesmen crowded to listen to the wondrous oratory of the Scottish divine.

The main object which engaged Chalmers on his arrival in Glasgow was the reorganization of the parochial system, so as to provide a machinery by which the destitute and outcast might be visited and reclaimed, and the young instructed in the lessons and duties of religion. Especial efforts were directed toward the establishment of Sabbath-schools. Great exertions were also made by him to get new churches erected throughout Glasgow, the poor church accommodation providing for scarcely a third of the inhabitants. In this he ultimately succeeded, and in addition, a new parish and church (Saint John's) were erected and endowed expressly for himself by the town council of Glasgow. To this he was in 1819 transferred from the Tron. In this charge he had as his assistant for two years Edward Irving (q.v.). The fatigues, however, which unremitting attention to parochial affairs involved were becoming too much for his health, and on the vacant chair of moral philosophy, in the University of Saint Andrews, being offered to him, he accepted it (1823).

In 1828 the divinity chair in the University of Edinburgh became vacant, and Chalmers was unanimously elected to it by the town council. This appointment he held till the disruption of the Scottish Church in 1843. In 1832 he published his 'Political Economy,' and shortly afterward appeared his contribution to the celebrated Bridgewater Treatises, 'On the Adaptation of External Nature to the Moral and Intellectual Constitution of Man.' In 1834 he was elected a corresponding member of the Royal Institute of France. An important matter which now largely engaged his attention was the subject of church extension, which he had zealously advocated from the days of his ministry in Glasgow. But Lord Melbourne's government was little disposed to aid the Church of Scotland on this occasion, and it was consequently obliged to carry out its scheme on the voluntary principle. Amid the various public movements with which Chalmers' name stands connected, there is none in which it more prominently occurs than in relation to the great non-intrusion movement in the Scottish Church. Throughout the whole of this memorable controversy, from the passing of the veto law by the General Assembly to the Disruption in 1843, he acted as the leader of the Evangelical party in their struggles with the civil power, and may be regarded as the founder of the Free Church, of the first assembly of which he was moderator. He was also the originator of the sustentation fund, out of which the ministers of that body are principally supported. Having vacated at the Disruption his professorial chair in the Edinburgh University, he was appointed, on the establishment of a new college in connection with the Free Church, to the offices of principal and primarius professor of divinity in that institution. The energy which made Chalmers remarkable as an orator was infused into all his practical undertakings; and the social and religious movements which he inaugurated left their mark far beyond the bounds of his own country. His published works are very numerous embracing sermons, tracts, essays, works on political economy, the parochial system, church establishments, etc. They exhibit the same energy of conviction, together with a breadth and profundity of view, which, though many of his theories have not been accepted by other thinkers, will always make them a rich mine of suggestion and instruction to inquirers into the complicated relations of human society. Consult 'Lives,' by Hanna (1849–52); Fraser (1881); Mrs. Oliphant (1893); Blaikie (1897). See FREE CHURCH OF SCOTLAND.

CHÂLONS-SUR-MARNE, shä-lôn sür märn, France, a city and capital of the department of Marne (Champagne), 107 miles east of Paris. It lies principally on the right bank of the Marne, here crossed by a stone bridge of three arches, built in 1787. Low walls now supply the place of the old ramparts, the entrance being by six gates, which open to six main roads. The principal public buildings are the cathedral of Saint Etienne, destroyed by fire in the 13th century, and restored by Louis XIV; the church of Notre Dame, of the 12th and 13th centuries, and now restored; the Hotel de Ville, built in 1772; the Hotel de la Prefecture, built in 1764, one of the finest buildings of the kind in France; public library, museum, hospital, etc. There is a promenade, occupying about 18 acres, formerly planted with superb elm trees, which the Germans cut down for fuel during the Franco-Prussian War. Châlons is the seat of a bishopric, and of one of the schools of arts trades, where 300 pupils are maintained and instructed at the public expense. There are manufactures of woolen and cotton goods; cotton mills, tanneries, etc. Châlons was fortified and embellished by the Romans. Christianity was preached here about the year 250. On the plains between Châlons and Troyes Attila suffered defeat in 451. From the 10th century it formed a kind of independent state, governed by its bishops, till 1360, when it was united to the Crown. A celebrated camp was established by Napoleon III in 1856, at the distance of about 18 miles from Châlons, for the purpose of training the French troops. In 1870 the town was occupied by the Germans after MacMahon's withdrawal, Pop. of commune 31,367.

CHÂLON-SUR-SAÔNE, sōn, France, a town of northeastern France, in the department of Saône-et-Loir, 81 miles north of Lyons. It is situated on the Saône, here crossed by a bridge of five arches, communicating with the suburb of Saint Laurent. It is irregularly built, and is surrounded by a wall and the remains of ancient fortifications. The public buildings include the church of Saint Vincent, built in 1386–1440; a bishop's palace of the 15th century; an extensive library, a gallery of painting, etc. Châlon is the seat of a tribunal of first resort and of commerce, and has a communal college. A branch of the celebrated Creusot ordnance and engineering works is here established, and it is the second industrial city of Burgundy. There are also dye-works, manufactories of leather, cloth, glass, etc., and a considerable trade in grain, flour and wines. The Saône becomes navigable for steamboats here, and there is steamer connection with Lyons. Cæsar had grain magazines at Châlon, and it became the capital of Burgundy under Gontran. In 1273 Edward I of England, being invited to a tournament here on his return from Palestine, attended with 1,000 men-at-arms; and some disputes having arisen, the

English attacked the French, killed a great number and left the tilting-ground strewed with the dead. This event is known as "the little war of Châlon." The town suffered considerably from the civil wars of the 15th and 16th centuries, and from the invasion of the allies in 1814. Pop. of commune 31,550.

CHALYBEATE, kạ-lĭb'ē-āt, **WATERS,** those which contain salts of iron in sufficient quantity to give them a special value in the treatment of cases of anæmia, etc. Iron or steel waters are not the only mineral waters in which some form of iron is found. Indeed in nearly all this ingredient exists, but in very many in such small quantity, while other ingredients are so conspicuous, that the character of the water can hardly be supposed to be affected by that metal. Those springs most successfully resorted to contain from one-third to nine-tenths of a grain of iron, in the form of carbonate, in 16 ounces. Some springs are classed as iron springs which contain barely one-fifth of a grain in 16 ounces of water. What are called pure iron springs are those which contain but a few grains of dissolved solids, a salt of iron existing to some appreciable amount; compound iron springs contain moderate quantities of other salts, such as Epsom and Glauber's salts, common salt, sulphate of lime, besides being rich in carbonic acid gas. The reason for the use of iron waters is that iron is a necessary ingredient of the blood, and in certain conditions promotes the formation of blood. Small doses only should be employed, as excess may irritate the stomach and bowels and produce constipation. It has been found that iron springs are most useful in cases of poverty of blood quickly produced, for example, by loss of blood by bleeding from the nose, or from wounds; by drain occurring from the blood, owing to diarrhœa, suppuration and other profuse discharges; in cases of chlorosis in young girls; and in poverty of blood dependent on acute disease, in which cases they materially promote convalescence. Iron springs are also used in disorders of menstruation, especially in its suppression; in malarious conditions and poverty of blood due to residence in tropical countries; and in neuralgia, sterility and impotency due to enfeebled conditions of general health. In such cases as these last the improvement is not so rapid, and is often best promoted by waters which, besides the iron, contain marked quantities of other ingredients, like common salt. It is chiefly in the form of carbonate that the iron exists, and this is the best form for administration. The presence of carbonic acid gas in the water keeps the carbonate of iron in solution, and when the water stands a yellowish rust is deposited. Iron springs are used for bathing, but it is not now believed that the iron produces any effect on the skin or is absorbed from the bath. Among the chief chalybeate springs are those at Saratoga, N. Y.; two at Harrogate, England, called the Muspratt and the Tewitt, the latter pure; a pure one at Tunbridge Wells; several at Bath; one at Bocklet, near the salt spring of Kissingen, containing much common salt and carbonic acid gas; those of Antogast, Freiersbach, Griesbach, Petersthal and Rippoldsau, in the Black Forest region, at altitudes of from 1,280 to 1,886 feet; one at Orrezza, in Corsica, with much carbon dioxide and traces of arsenic; many at Spa; one at Saint Moritz, Switzerland, situated at an elevation of 5,710 feet; one at Santa Catarina, Italy, three miles from Bormio, at a height of 5,600 feet; several very popular pure ones at Schwalbach in Nassau; one at Pyrmont, Waldeck; and one at Cheltenham, with a very high proportion of iron carbonate.

CHALYBITE, kăl'ĭ-bīt, or **SIDERITE,** a common iron ore. It is iron protocarbonate, $FeCO_3$, containing 48.2 per cent of metallic iron, It occurs in rhombohedral crystals, also botryoidal, globular, compact or earthy, but most commonly cleavable-massive. Its hardness is 3.5 to 4, but in the siliceous variety, clay iron stone, found in many coal formations, it sometimes runs up to 7. Its specific gravity is about 3.85, lustre vitreous to pearly, color usually brown or yellowish-gray. It is generally nearly opaque. It occurs in enormous quantities in Austria, also at Roxbury, Conn. It is a frequent associate of silver, lead and copper ores. Clay iron-stone is considered the most important iron ore of England.

CHAM, shăn (pseudonym of AMÉDÉE DE NOÉ), French caricaturist: b. Paris, 26 Jan. 1819; d. 6 Sept. 1879. He adopted the name Cham (Ham) as one of the sons of Noah, his father being M. de Noé (Noah). The son of a peer of France, he attended the polytechnic school; but following his artistic inclinations, became a pupil of Delaroche and Charlet, and acquired distinction as a caricaturist by his spirited and humorous contributions to the Paris *Charivari* and by the publication of several collections of caricatures, among the best of which are 'Années comiques' (1880); 'Les folies parisiennes' (1883).

CHAMA, kā'mą, a genus of bivalve mollusks, the typical one of the family *Chamidæ*. The shell has foliaceous valves, the upper one the smaller, one valve attached to another body by the left umbo; the hinge tooth of the free valve is received between two teeth of the other. The chamas are found less than 50 fathoms deep in tropical seas, especially among coral reefs. Fifty recent species are known, and 40 fossil, the latter from the Cretaceous onward. The still existing *Chama gigas* sometimes weighs 300 pounds, and may measure four feet across. The byssus by which it adheres to the rock is so tough that a hatchet is required to cut it through. One valve is sometimes used in churches as a baptismal font.

CHAMÆROPS, kă-mē'rŏps, a genus of palms established by Linnæus, and remarkable as containing the species of the palm family found at the greatest distance from the equator. It is characterized by its flabelliform leaves, polygamous and sometimes diœcious flowers, and its three-sided monospermous drupes. *C. humilis* is the only palm native of Europe. It is confined, however, to its hottest parts, and even there is generally only from four to five feet high. Its trunk, from five to six inches in diameter, is closely covered with triangular hard scales, the bases of the old leaves; the new leaves grow in a tuft at the top. Sometimes the stem does not appear at all; and the leaves, apparently issuing from the ground in the form of a large fan, have procured for the plant the name of the fan-palm. In hothouses the stem attains the height of 15 feet or more. The leaves are used for thatch and

other purposes, and they furnish a large quantity of fibre, which forms an article of commerce and yields a material that may be used instead of horse-hair.

CHAMALARI, chä-mä-lä'rē, or **CHAMALHARI,** a peak of the Himalaya Mountains, at the western extremity of the boundary line between Bhutan and Tibet. Height 23,929 feet.

CHAMBA, British India, a state of the Punjab district, north of the districts of Kangra and Gurdaspur and in the Lahore division of North India, area, 3,216 square miles. It is a mountainous tract, shut in on almost every side and traversed by two hill-ranges. The crops consist of all kinds of grain and the supply of iron and slate is plentiful. The sanitarium of Dalhousie is in this district. The annual revenue is about $170,000. Pop. 135,873.

CHAMBAL, chŭm'bul, a river in Rajputana, Central Provinces of British India, flowing into the Jumna; length, 750 miles.

CHAMBER, a term having various technical meanings. The chamber of a cannon is that part of the bore of a cannon which receives the powder with which it is charged. The chamber of a mine is the place where the charge of powder is lodged that is to be used for blowing up the works. In several languages chamber is used to designate a branch of government whose members assemble in a common apartment. A chamber of commerce is a board or association to promote the interests of the trade and merchandise. See CHAMBERS OF COMMERCE.

CHAMBER MUSIC. The name given to music particularly designed for performance in a room or small hall with few performers, as contrasted with music requiring many performers and given on a stage in a larger hall, or in the opera-house. It is generally, though it was not formerly, applied to instrumental music only. Originally it meant music for the few, usually, of course, the wealthy, who cultivated it in the privacy of their homes and who, as in the case of the Esterhazy family, in whose service Haydn spent 30 years of devoted effort, made of it a formal function. As early as the time of Louis XIV, with his «Maitre de la Musique de la Chambre de Roy,» chamber music was recognized as a separate branch of the art. Dance tunes were its earliest basis and in the form of suites were written or arranged for various combinations of instruments. (The lute figured prominently at first, but was gradually elbowed out by the members of the violin family). A little later, the more highly developed sonata form was utilized; and while to-day this designation is confined to pieces for piano or piano and one other instrument, the first sonatas were written for instruments in combination and especially for stringed instruments. Corelli, one of the greatest Italian composers (1653–1713), composed no less than 60 sonatas, among them 24 'Sonate da Camera' for several different instruments of the violin group.

The string quartet (written for two violins, viola and 'cello) is the typical chamber music of modern times and, beginning with Haydn, nearly all of the great composers have contributed generously to its literature. While not a pioneer in this field, Haydn is entitled to the credit of giving to the string quartet the stamp of perfection as an art form, which has belonged to it ever since; and to the Esterhazy family as his patrons, and to other noblemen who bore somewhat similar relations to Mozart and Beethoven may be attributed much of the impulse to this character of musical composition. In the immense volume of Haydn's works, his chamber music bulks large. Directly inspired by Haydn's efforts, Mozart began to write quartets and he dedicated six of the best to Haydn. The relations of Haydn and Mozart, and their remarkable reaction on each other, form a most interesting chapter in musical history. Haydn, who outlived Mozart many years, composed his best chamber music after Mozart had died, and it bears the unmistakable impress of the younger man's influence. Beethoven's activities in chamber music furnish clear evidence of the high seriousness with which composers have always approached this branch of their art. Comparatively early in his development, he wrote six quartets (Opus 18); and he made further essays as his career progressed. Finally, his sonatas and symphonic works and his great mass in D finished, he turned for his last expression in music, his peroration, to the quartet and wrote five, which rank with his finest works. Since Beethoven's day, chamber music has undergone little change or development. There have been beautiful accessions to its literature. Schubert, Schumann, Brahms, Franck and Tschaikowsky have all poured rich new wine into the old bottle; but it remains as Beethoven left it, the most chaste receptacle for musical thought yet fashioned. In addition to the string quartet, chamber music furnishes compositions for many other combinations of string instruments alone — trios, quintets, sextets and still larger groups — also, quite frequently, for piano and strings and, less often, for combinations including one or more wind instruments. Schubert's octet for two violins, viola, 'cello, bass, clarinet, horn and bassoon is one of the most important works in this field. But here, obviously, the approach is definitely toward the orchestra, with its variegated tonal tints, which are foreign to the true conception of chamber music. Next to the string quartet, the piano quartet and quintet are the favorites of the more modern composers. The piano quintets of Schumann, Brahms and Franck form a magnificent triumvirate. To the musician universally, chamber music represents the purest form and the highest achievement in the art. Without the extraneous attractions of program, orchestral color or scenic effect, depending for its appeal on the most abstract presentation of creative thought, it has evoked from composers the finest manifestations of their genius; and the contributions of Debussy, Ravel, Schönberg and others of the ultra-modern schools show that the appeal is as potent to-day as it was in the last century. Consult Kilburn, N., 'The Story of Chamber Music' (London 1904); Krause, E., 'Die Entwicklung der Kammermusik' (Hamburg 1904); Schering, A., 'Geschichte des Instrumentalkonzerts' (Leipzig 1905).

LEWIS M. ISAACS.

CHAMBERLAIN, Alexander Francis, American ethnologist and educator: b. Kenninghall, Norfolk, England, 12 Jan. 1865; d. Worcester, Mass., 8 April 1914. He was graduated at Toronto University in 1886 and from 1886 to 1891 was examiner in modern

languages successively at Toronto University, Trinity University and in the educational department of the province of Ontario. In 1892 he was appointed lecturer and afterward assistant professor of anthropology at Clark University. Under the auspices of the British Association he made a special investigation of the Kootenay and Chinook Indians in British Columbia. He was editor of the *Journal of American Folk-Lore* in 1901–08. He was elected a fellow of the American Association for the Advancement of Science. He wrote 'Report on the Kootenay Indians' (1892); 'Language of the Mississaga Indians' (1892); 'The Mythology of the Columbian Discovery' (1893); 'Child and Childhood in Folk-Thought' (1896); 'The Child: A Study in the Evolution of Man' (1900); 'Poems' (1904), and contributions to various periodicals on South American and Asiatic tribes and people.

CHAMBERLAIN, Basil Hall, English Japanese scholar: b. Southsea, 18 Oct. 1850. He is a grandson of Basil Hall (q.v.). He is emeritus professor of Japanese and philology at the Imperial University of Tokio, and has published 'The Classical Poetry of the Japanese' (1880); 'Translation of the Kojik' (1883); 'A Romanized Japanese Reader' (1886); 'Language, Mythology and Geographical Nomenclature of Japan in the Light of Aino Studies' (1887); 'Luchuan Grammar' (1895); 'Handbook of Colloquial Japanese'; 'Things Japanese' (1890); 'Japanese Poetry' (1910).

CHAMBERLAIN, Charles Joseph, American botanist: b. Sullivan, Ohio, 23 Feb. 1863. He was graduated at Oberlin College in 1888, taught in Ohio and Minnesota 1888–93, when he entered the University of Chicago, from which he received the degree of Ph.D. in 1897. In the last-named institution he was assistant in botany 1896–99, associate 1899–1901, instructor 1901–07, became assistant professor in 1907, associate professor in 1911 and professor in 1915. He spent 1901–02 at Bonn, Germany, in research work, was editor of "Current Botanical Literature" in *Journal of Applied Microscopy* 1899–1903; and since 1902 has edited the department of cytology of the *Botanisches Centralblatt.* He is also a regular contributor to the *Botanical Gazette,* is a member of the Botanical Society of America, of the Association Internationale des Botanistes, of Die deutsche Botanische Gesellschaft and the Naturforscher Gesellschaft an der Königliche Universität zu Kiew. He is also a fellow of the American Association for the Advancement of Science. He has published 'Methods in Plant Histology' (3d ed., 1915); 'Morphology of Gymnosperms' in collaboration with John M. Coulter (2d ed., 1910); 'Morphology of Angiosperms,' in collaboration with J. M. Coulter (1903); and various articles especially on cycadaceæ, in which connection he has made four exploring expeditions to the tropics of southern Mexico, besides expeditions to Cuba, New Zealand, Australia and Africa.

CHAMBERLAIN, Daniel Henry, American politician: b. West Brookfield, Mass., 23 June 1835; d. 13 April 1907. He was graduated at Yale in 1862 and at Harvard Law School in 1863. In 1864 he was commissioned lieutenant in the 5th Massachusetts colored cavalry, served in Maryland, Louisiana and Texas and was promoted captain. In 1866 he settled as a cotton planter in South Carolina. Upon the call for a constitutional convention he was chosen a delegate, and was subsequently elected attorney-general, a position he held for four years. From 1872 to 1874 he practised law at Columbia, S. C. He was governor of the State 1874–77. Though renominated in 1876 and reinaugurated in January 1877, his election was contested by Wade Hampton, the Democratic candidate for governor. After the inauguration of President Hayes, both contestants were invited to a conference at Washington, which resulted in the United States troops (which had been sent to support Chamberlain) being withdrawn from South Carolina and Governor Chamberlain withdrawing his claim to election. He resumed law practice in New York city until his retirement to West Brookfield, Mass. He has published several addresses and pamphlets, the latest of which is 'Charles Sumner and the Treaty of Washington' (1902). Consult Allen, 'Governor Chamberlain's Administration in South Carolina' (1888).

CHAMBERLAIN, George Earle, American legislator and State governor: b. Natchez, Miss., 1 Jan. 1854. He was graduated in 1876 from Washington and Lee University and began practice as a lawyer in Oregon, where he became a member of the State legislature, district attorney, State attorney-general and in 1902 and 1906 Democratic governor of Oregon. In 1909 he was selected United States senator for the term ending 1915 and in this position was chairman of numerous important committees, including the public lands committee. He was re-elected for the term 1915–21.

CHAMBERLAIN, Houston Stewart, English-German author: b. Southsea, England, son of a British admiral, 9 Sept. 1855. He was educated in France and England and in 1870 settled at Stettin, Germany, where he continued his studies under Professor Kuntze and devoted himself to research in German civilization and culture, also studying music under Ruthard. He married one of Wagner's daughters in 1878. From 1885 to 1889 he resided in Dresden when he settled permanently in Vienna. Writing with equal ease in German, English and French, he was very active as a contributor to periodical literature, and besides his fine and comprehensive biography of Richard Wagner, his *magnum opus,* in German (1896), English (1897), French (1899), his published works include 'Die Grundlagen des 19 Jahrhunderts' (2 pts., 1899–1901), reprinted in many editions; translated into English by Lord Redesdale (1910); 'Das Drama Richard Wagner's ' (1892); and other Wagner books; 'Worte Christi' (1901); 'Heinrich von Stein' (1903); 'Immanuel Kant' (1905); 'Goethe' (1912).

CHAMBERLAIN, Jacob C., American missionary: b. Sharon, Conn., 13 April 1835; d. 2 March 1908. He was graduated at Western Reserve University 1856; studied at the Dutch Reformed Church Theological Seminary 1859 and took a medical degree at the College of Physicians and Surgeons, New York. In 1859, he went as a medical missionary to southern India and till his death resided in the Madras presidency. He established a hospital and dispensary at Madanapalli 1868 and another at

Palamanair 1872. He translated the Reformed Church liturgy into Telugu Madras (1873), and also 'Hymns for Public and Social Worship' (1884). He wrote 'The Bible Tested' (1878; 7th ed., 1885); 'Native Churches and Foreign Missionary Societies' (1879); 'Winding up a Horse; or Christian Giving' (1879); 'Break Cocoanuts Over the Wheels: or All Pull for Christ' (1885); 'The Kingdom in India: Whose?' (1907); 'The Cobra's Den and Other Stories of Missionary Work among the Telegus of India' (1900).

CHAMBERLAIN, John Loomis, American army officer: b. New York, 20 Jan. 1858. He was graduated at the United States Military Academy in 1880. For years he was an officer of the line. He was graduated from the Army Service School, the Artillery School at Fort Monroe and the Army War College, and for four years (1884–88) he was an instructor at the Military Academy, West Point. In the winter of 1890–91, while a junior officer in the service, he took an active part in the campaign against the Sioux Indians. In 1891–93 he was chief ordnance officer of the Missouri department and in 1895–96 served as instructor in military science and tactics at the Peekskill Military Academy. In 1897–98 he was appointed military attaché at Vienna, but resigned this post on the outbreak of hostilities with Spain. Throughout the war he served as a major of United States Volunteers with the Seventh Army Corps. In 1900 he became a major in the inspector-general's department through a competitive examination, open to all captains of the line. He investigated the Pacific transport service in 1901, the result being a complete reorganization of the personnel. He has seen nearly five years' service in the Philippines and in the course of his duties has also visited China and Japan. In 1913 his investigation of the aviation section of the Signal Corps resulted in changes of policy and a reorganization of the service. In February 1917 he was appointed inspector-general, with the rank of brigadier-general, and on 6 Oct. 1917 was appointed major-general.

CHAMBERLAIN, Joseph, English statesman: b. London, 8 July 1836; d. Birmingham, 2 July 1914. He was for a time at University College School, London, and in 1854 he entered into partnership with his cousin, Joseph Nettlefold, as a screw manufacturer in Birmingham — a business in which his father was also interested. He retired from active business life in 1874 after having amassed a handsome fortune. He was by this time coming to the front as the "rising hope" of the advanced Radicals. As a member of the Birmingham School Board, and its chairman from 1874 to 1876, he took up an attitude of uncompromising hostility to the denominational school system. In 1869 he was elected a member of the Birmingham Town Council. His tenure of the mayoralty (1874–76) was notable for sweeping reforms; new municipal buildings were built, the gas and water undertakings were municipalized and a great city improvement scheme was successfully carried out. After an unsuccessful parliamentary contest at Sheffield in 1874, he was in 1876 returned unopposed for Birmingham. He rapidly made his mark in Parliament; he infused new life into the Radical organization, and on the return of the Liberals to office in 1880 entered the Cabinet as president of the Board of Trade. To Mr. Chamberlain's exertions was due the passing of an important bankruptcy act, and his attempt to amend the merchant shipping acts, though unsuccessful, formed the basis of later legislation. His influence meantime was rising in the country; he stood out as an opponent of "coercion" in Ireland and favored a large measure of self-government, and in the election of 1885 he preached the doctrine of "ransom" and the "restitution" of property with a frankness that alarmed moderate Liberals, and enunciated an "unauthorized program" which included free education, small holdings and a graduated system of taxation. After that election and the subsequent defeat of the Salisbury ministry and when the tenure of the Liberal government in office depended on the Irish vote and a Home Rule measure became imminent, he accepted the presidency of the Local Government Board, but resigned on 15 March 1886 on account of hostility to Mr. Gladstone's Home Rule Bill of that year. With the other "dissentient Liberals" he voted against that measure and assisted materially in the defeat of the Liberals at the polls at the ensuing general election. For a time it seemed as if the breach in the Liberal ranks might be healed, but after a "Round Table" conference in 1887 it grew wider and Mr. Chamberlain became the object of intense dislike on the part of the Home Rule party. He held no office in the Unionist administration from 1886 to 1892, but his influence was felt in legislation, and he succeeded in getting some radical measures passed, such as free education. As a member of the commission to settle the fisheries dispute with Canada, he visited Washington in 1887 and succeeded in negotiating the Chamberlain-Bayard Treaty, which however was refused ratification by the American Senate. Another result of his visit was that he married in 1888, as his third wife, Mary, daughter of William C. Endicott, Secretary of War in President Cleveland's first administration.

On the elevation of Lord Hartington to the House of Lords as the Duke of Devonshire in 1891, Mr. Chamberlain succeeded to the leadership of the Liberal Unionists in the House of Commons. During the passage of Mr. Gladstone's second Home Rule bill (1893) through the House of Commons, Mr. Chamberlain was the life and soul of the opposition, his discussion of the various amendments being marked by a masterly debating power and keen analytical skill. On the return of the Unionists to power in 1895 he was appointed Secretary for the Colonies. His tenure of that office may be said to have been the turning point in the relations of the colonies with the mother country; his sympathetic understanding of colonial aspirations was soon apparent, and his talents as a business man and skill in administration found a fruitful field. When the "Jameson Raid" occurred in the Transvaal, he at once repudiated all connection with it on the part of the British authorities, and he subsequently denied in the most distinct manner having had any personal foreknowledge or suspicion of what was about to take place. The country was sharply divided on his conduct of the negotiations preceding the outbreak of the

war with the South African Republic in 1899, but his influence in the country was a main cause in the Unionist triumph in the "Khaki" election in 1900. On the conclusion of hostilities he visited South Africa and personally initiated the measures adopted to repair the ravages of war. His influence was manifest in the provisions of the Workmen's Compensation Act of 1897, and he carried through the Australian Commonwealth Bill in 1900.

In 1903 Mr. Chamberlain launched another "unauthorized program," which aimed at the reversal of the traditional free trade fiscal policy of Great Britain and at the setting up of preferential tariffs within the Empire, and he resigned his place in the Cabinet the better to pursue this missionary enterprise. He found support from the majority of the Unionist party; but a powerful minority, including such distinguished men as Devonshire, Goschen and St. Aldwyn, stood for the old policy; Mr. Balfour, on whom devolved the duty of keeping his party together, gave to "tariff reform" but a dubious and hesitating support; the Unionist party was rent in twain; and at the general election of 1906 — at which Mr. Chamberlain's policy was only one among other issues — the Unionist government suffered a disastrous defeat. Mr. Chamberlain from 1903 had been conducting a strenuous campaign on behalf of "tariff reform" that had severely taxed his strength, and his last years were spent as an invalid; but from time to time he continued to inspire his followers with messages in the press.

Mr. Chamberlain was the first purely business man, untaught in any of the universities, to rise to a commanding place in British public life, and he profoundly affected the style of debating in the House of Commons. His lithe spare figure, clean-cut, incisive features and single eyeglass were essential parts in the "make-up" of a singularly forceful and dominating personality. In his talents as an administrator, in his capacity for getting through business, he was almost unrivaled. As a debater he was cool and resourceful, a hard but a clean hitter, and never so dangerous an antagonist as when he seemed to be fighting in a disadvantageous position. His utterances had a simplicity, directness and force which made him powerful no less in the country than on the floor of the House; but these characteristics proved an embarrassment when translated into the field of foreign relationships. He had, as Lord Morley has said, a "genius for friendship," both private and public; and his trait in his character, and the response it evoked, were happily illustrated in his relations with those whom he was proud to call "his own people," the constituents of the city of Birmingham, who from first to last, for a period of nearly 40 years, through all his mutations of opinion, stood by him with an unshaken and almost unexampled fidelity. Consult biographies by Creswicke (4 vols., London 1900–05); Jeyes (ib. 1896); Mackintosh (ib. 1906); Morris (ib. 1909); and Viscount Morley's 'Recollections' (2 vols., 1917).

CHAMBERLAIN, Joseph Austen, English politician, son of Joseph Chamberlain (q.v.): b. 1863. He was educated at Rugby and Trinity College, Cambridge. He was Civil Lord of the Admiralty 1895–1900, Financial Secretary to the Treasury 1900–02, Postmaster-General 1902–03, Chancellor of the Exchequer 1903–06, and since 1915 Secretary for India in the coalition government. He represented East Worcestershire in the House of Commons 1892–1914 and since the latter year has represented his father's old constituency, West Birmingham.

CHAMBERLAIN, Joshua Lawrence, American soldier and educator: b. Brewer, Me., 8 Sept. 1828; d. 24 Feb. 1914; graduated Bowdoin College 1852 and Bangor Theological Seminary 1855; received the honorary degree of LL.D., Pennsylvania College, 1866, and from Bowdoin College 1869; professor of rhetoric and oratory, Bowdoin, 1856, and in 1861 professor of modern languages of Europe. On 8 Aug. 1862 he entered the army as lieutenant-colonel of volunteers and served through the Civil War in the Army of the Potomac in every campaign and nearly every great battle from Antietam to Appomattox, and was several times wounded, twice severely. He received the Congressional Medal of Honor for his remarkable conduct in the defense of Round Top, Gettysburg, 2 July 1863, and was advanced to the command of a brigade. On 18 June 1864 he was promoted brigadier-general on the field by General Grant for distinguished gallantry in leading a desperate charge, and early the following spring he received a special promotion as brevet major-general, "for conspicuous gallantry in action." In the campaign of 1865 he commanded two brigades of the first division, fifth corps. In the order disbanding that army he was retained in the service and was offered a colonelcy in the regular army, but the condition of his wounds induced him to decline the service, and in January 1866 he returned to Maine.

In the autumn of that year he was elected governor of Maine, and served in that office for four terms. In 1871 he was chosen president of Bowdoin College, and continued in that position for 12 years, his administration being marked by a broadening of the course and a large increase in the resources of the college. During this time he was elected major-general of Maine, to command the militia of the State. In 1880 when for a time there was no active or legal State government, he was called to the capital "to preserve the peace and institutions of the State." This he accomplished without the use or show of military force. In 1883 he retired from the presidency of Bowdoin and settled in New York to practise law. In 1885 he went to Florida and engaged in the work of railroad building and public improvements on the West Coast. He was much sought for as writer and orator. He published 'Maine, Her Place in History' (1877); 'Ethics and Politics of the Spanish War' (1898); 'Property: Its Office and Sanction' (1900); 'De Monts and Acadia' (1904); 'Ruling Powers in History' (1905). He also edited 'Universities and Their Sons' (1898).

CHAMBERLAIN, Mellen, American lawyer, librarian and historian: b. Pembroke, N. H., 4 June 1821; d. Chelsea, Mass., 25 June 1900. He was graduated at Dartmouth College in 1844 and at the Harvard Law School in 1848. In 1849 he was admitted to the bar, opened a law office in Boston and made his residence in

Chelsea, where, during 51 years of citizenship, he served the town in many public capacities. In 1858 and 1859 he was a member of the Massachusetts house of representatives and the senate in 1863–64. He was associate justice of the Municipal Court of Boston 1866–70, and chief justice 1870–78. On 26 Aug. 1878 he was chosen librarian of the Boston Public Library, serving until ill health compelled his retirement in 1890. During his administration the new library building was begun and the corner-stone laid. Throughout his life he was a close student and investigator of American history. Besides important chapters in Winsor's 'Memorial History of Boston' (1881), and 'Narrative and Critical History of America' (1888), he wrote 'John Adams, the Statesman of the Revolution' (1884); The Authentication of the Declaration of Independence' (1885); 'John Adams, the Statesman, with Other Essays and Addresses' (1898); 'The Journals of Captain Henry Dearborn, 1775–83' (1886–87); 'The Constitutional Relations of the American Colonies to the English Government at the Commencement of the American Revolution' (1887).

CHAMBERLAIN, Montague, American naturalist: b. Saint John, New Brunswick, 5 April 1844. He was educated privately, both his parents being teachers. Though engaged in mercantile pursuits, he devoted much time to the study of natural history and came to be well known as an ornithological writer. In 1889 he became assistant secretary of the Lawrence Scientific School of Harvard University, and from 1893–1900, secretary. A member of several scientific bodies, his chief publications are 'Canadian Birds' (1870); 'Birds of New Brunswick' (1882); 'Mammals of New Brunswick' (1884); 'Systematic Table of Canadian Birds' (1887); 'Birds of Greenland' (1892); 'Some Canadian Birds' (1895); 'The Church Army' (1897); 'Maliseet Vocabulary' (1899); 'The Penobscot Indians' (1899), etc.

CHAMBERLAIN, Nathan Henry, American clergyman: b. Bourne, Mass., 25 Dec. 1830; d. there, 1 April 1901. He graduated at Harvard, 1853, and studied theology at the divinity school there, and at Heidelberg, Germany, eventually becoming a Unitarian minister. He was pastor at Canton, Mass., 1857–59, and at Baltimore, Md., 1860–63. He then took orders in the Episcopal Church, and became rector at Birmingham, Conn., 1864–67; Morrisania, N. Y., 1868–71; Milwaukee, Wis., 1871–73; Somerville, Mass., 1874–79; East Boston, Mass., 1882–89. He then retired to devote himself to literary pursuits. His books are 'Autobiography of a New England Parish' (1864); 'The Sphinx in Aubrey Parish' (1889); 'What is the Matter with our Tariff and its Taxes' (1890); 'Samuel Sewall and the World He Lived In' (1897), an admirable study of colonial life in New England; 'Life of Sir Charles Napier'; 'An Itinerary of Cape Cod.'

CHAMBERLAIN, Samuel Selwyn, American journalist: b. Walworth, N. Y., 25 Sept. 1851; d. San Francisco, Cal., 25 Jan. 1916. He was graduated from New York University in 1875, and at once entered the journalistic field with the New York *Herald;* he went abroad with Mr. Bennett of the *Herald,* and was for a time editor of the Paris edition of that journal. In 1879 he became editor of the *World,* but left to take charge of the *Evening Telegram* in 1881. He founded *Le Matin* of Paris in 1884 and edited it for two years and then returned to the United States. In 1889 Mr. Hearst engaged him as editor of the San Francisco *Examiner,* and he remained on the Pacific coast until 1895, when he came to New York as editor of the *Morning Journal.* In 1900 he became managing editor of the Philadelphia *North American,* which soon resumed its old place among the successful publications of that city. In a year or two Mr. Chamberlain returned to the Hearst service, and until his death acted as general staff officer. He went to the Chicago *Examiner,* was recalled to the New York *American,* and for several years, until the spring of 1915, had been the Hearst representative in London. His last work was editor of the Boston *American.* He was recognized as an exceptionally able newspaper man; his forte was a news touch of charming delicacy; he had unerring news perception and understood and carried out feature ideas that were distinct.

CHAMBERLAIN, S. D., city and county-seat of Brule County, on the Missouri River and on the Chicago, Milwaukee and Saint Paul Railroad, 85 miles southeast of Pierre. It is a thriving stock-raising centre, and has flour mills, bottling works and a cement factory. The public institutions include a free library, sanitarium, Columbus College and the river island park of 1,000 acres, donated to the city by the Federal government. Chamberlain is governed by commissioners. Pop. 1,275.

CHAMBERLAIN (Germ. *Kammerherr;* Ital. *Camarlingo*), court officer, originally employed, as the name indicates, to take charge either of the private apartments of a prince, or of a treasury, called in the 10th century *camera* (whence the word chamber). The golden key, which is worn by the chamberlains of the European courts on two small golden buttons (as well as the buttons themselves, when the key is omitted), indicates also the origin of the office. At present the employment of chamberlains (when their office is not merely nominal) is to attend on the persons of the princes and their consorts. There is generally a chief or high chamberlain. This officer in England is called Lord Great Chamberlain of England. His office is one of great antiquity and honor, being ranked as the sixth great office under the English Crown. It is entirely distinct from that of Lord Chamberlain of the Household (see below). To the Lord Great Chamberlain belong lodging and livery at the king's court; and there are certain fees due to him from each archbishop and bishop when they perform their homage to the king; and from all peers at their creation, on doing their homage. At the coronation of the sovereign, he has an allowance of 40 ells of crimson velvet for his own robes. This officer, on the coronation day, is to bring the king his shirt, coif and wearing apparel, and after the king is dressed, he claims his bed and all the furniture of his chamber for his fees; he also carries at the coronation the coif, gloves and linen to be used by the king on that occasion; also the sword and scabbard, the gold to be offered by the king, and the robes royal and crown; he dresses and undresses the king on that day, waits on him before and after dinner, etc. This

officer has also the care of providing all things in the House of Lords during session; the government of the palace of Westminster; and he disposes of the sword of state to be carried before the king, to any lord he pleases. The office of Lord Great Chamberlain of England is hereditary, and has descended through the two sisters and coheiresses of the 4th Duke of Ancaster (d. 1779) to its present holders, the Earl of Ancaster, the Marquess of Cholmondeley and the Marquess of Lincolnshire, who act in rotation. The last-named performs the duties during the present reign. The keys of Westminster Hall and the Court of Requests are delivered to the Lord Great Chamberlain on all solemn occasions. He goes on the right hand of the sword, next the king's person. The Gentleman Usher to the Black Rod, Yeoman Usher, etc., are under his authority.

The Lord Chamberlain of the Household is an officer who has the oversight and direction of all the officers belonging to the king's chambers, except the precinct of the king's bedchamber. He has the oversight of the officers of the wardrobe at all His Majesty's houses, and of the removing of wardrobes or of beds, tents, revels, music, comedians, hunting, messengers, etc., retained in the king's service. He moreover has the entire oversight and direction of the sergeants-at-arms, of all physicians, apothecaries, surgeons, barbers, the king's chaplains, etc., and administers the oath to all officers above stairs. To his department belong the two dramatic censors, called *Examiners of Plays*.

The Chamberlain of London receives and keeps the city money which is laid up in the chamber of London; he also presides over the affairs of masters and apprentices, and admits duly qualified persons to the freedom of the city, etc. His tenure of office only lasts a year, but he is usually re-elected.

At all monarchical courts there are almost as many different chamberlains as there are kinds of chambers; the English chamberlains here cited, and their duties, may be taken as typical.

CHAMBERLIN, Joseph Edgar, American journalist: b. Newbury, Vt., 6 Aug. 1851. Until 1890 he was on the staffs of papers in Newport, R. I., Fall River, Mass., Chicago and Boston. From 1890 to 1900 he was assistant editor of the *Youth's Companion*, an essayist and magazine writer. During the Spanish War he was war correspondent of the New York *Evening Post* in Cuba; was literary editor, editorial writer and art critic of the New York *Evening Mail* 1901–15; with the Boston *Transcript* as editorial writer since 1915. He has published 'The Listener in the Town' (1896); 'The Listener in the Country' (1896); 'Life of John Brown of Ossawatomie' (1899); and 'The If's of History' (1907).

CHAMBERLIN, Thomas Crowder, American geologist: b. Mattoon, Ill., 25 Sept. 1843. He was educated at Beloit College and the University of Michigan; was professor of natural sciences in Whitewater Normal School, Wis., 1869–73; professor of geology at Beloit College 1873–82; president of the University of Wisconsin 1887–92; and has been dean of the scientific faculty of the University of Chicago from 1892. He was assistant State geologist of Wisconsin 1873–76, and State geologist from 1876–82. He became United States geologist in charge of the glacial division 1882–1907, and was geologist of the Peary Relief Expedition 1894. He is a member of many scientific societies, and in 1907 was president of the Illinois Academy of Science, and president of the Chicago Academy of Sciences 1898–1914. He is the author of 'Geology of Wisconsin' and of many important papers printed by the United States Geological Survey and is editor of the *Journal of Geology*.

CHAMBERS, Edward Thomas Davies, Canadian journalist: b. Saffron Walden, Essex, England, 1852. He emigrated to Canada in 1870, and after teaching a short time entered journalism, becoming chief editor of the Quebec *Daily Chronicle* in 1897. He has published 'The Port of Quebec' (1890); 'The Haunts of the Ouaniche' (1891); 'Quebec: Ancient and Modern' (1892); 'Quebec, Lake Saint John and the Saguenay' (1893); 'Chambers' Guide to Quebec' (1895); 'The Book of the Ouaniche and its Canadian Environment' (1896); 'Angler's Guide to Eastern Canada' (1898); 'Sportsman's Companion' (1899); and the 'Quebec Tercentenary History' (1909).

CHAMBERS, Ephraim, English miscellaneous writer and encyclopedist: b. Kendal, Westmoreland, about 1680; d. 15 May 1740. On leaving school he was apprenticed to a mathematical instrument and globe maker in London. Here he acquired such a taste for the study of science, and made so much proficiency in it, that he not only formed the design of compiling his famous 'Cyclopædia,' or an Universal Dictionary of the Arts and Sciences, but actually wrote some of the articles for it behind his master's counter. The first edition of this work was published in 1728, and Chambers was soon after chosen F.R.S. Two subsequent editions, in 1738 and 1739, appeared previously to his death. A French translation of the 'Cyclopedia' was the basis of the 'Encyclopédie' of Diderot and D'Alembert. A revised and enlarged edition was brought out first by Scott and Hill, and afterward, 1781–86, by Dr. Rees, who latterly built up on it the work known by his own name.

CHAMBERS, Ernest John, Canadian litterateur: b. Penkridge, Staffordshire, England, 16 April 1862. He was educated at Montreal High School, engaged in journalism in that city for many years; as newspaper correspondent he served with General Middleton's forces in the Northwest Rebellion (1885); and was editor of the Calgary *Herald* 1888–89. He was appointed gentleman usher of the Black Rod in the Canadian Parliament in 1904. From 1893–96 he was editor of the *Canadian Military Gazette*, and since 1908 has edited the 'Canadian Parliamentary Guide.' Among other works, he is the author of 'Canada's Fertile Northland' (1908) and the 'History of the Royal Northwest Mounted Police,' and he has written many regimental histories of the Canadian militia. During the Great War he acted as chief press censor for Canada.

CHAMBERS, Robert, Scottish prose-writer and publisher: b. Peebles, 10 July 1802; d. Saint Andrews, 17 March 1871. He and his brother William (q.v.) began in poverty as

small booksellers; issued penny leaflets of useful information for the people, written in a clear and simple though not infantile style, which became very popular, and at last took regular periodical form in *Chambers' Journal,* and the great publishing-house which bears the name of both developed gradually. The 'Chambers' Encyclopædia for the People' was the outgrowth of the *Journal,* and edited by the brothers. Robert wrote also 'Traditions of Edinburgh'; 'History of the British Empire'; 'Domestic Annals of Scotland'; 'The Book of Days'; 'Cyclopædia of English Literature'; 'Ancient Sea Margins,' etc., but his most noted book was the anonymous 'Vestiges of Creation.'

CHAMBERS, Robert William, American artist and novelist: b. Brooklyn, N. Y., 26 May 1865. He began his career as an artist after studying at the Julian Academy, Paris, and became an illustrator for various New York weeklies; but he soon abandoned this for the literary field in which he achieved considerable success through his popular novels. He wrote a drama, entitled 'The Witch of Ellengowan,' for Ada Rehan, which was performed at Daly's Theatre, New York. He has written 'In the Quarter' (1893); 'The King in Yellow' (1893); 'The Red Republic' (1894); 'A King and a Few Dukes' (1894); 'The Maker of Moons' (1895); 'Oliver Lock'; 'The Mystery of Choice' (1896); 'Lorraine' (1896); 'Ashes of Empire' (1897); 'The Haunts of Men' (1898); 'The Cambric Mask' (1899); 'Outsiders' (1899); 'The Conspirators' (1900); 'Cardigan' (1901); 'The Maid at Arms' (1902); 'The Maids of Paradise' (1903); 'With the Band,' a volume of ballads; 'Iole' (1905); 'The Reckoning' (1905); 'The Tracer of Lost Persons' (1906); 'The Fighting Chance' (1906); 'The Three of Heaven' (1907); 'The Younger Set' (1907); 'Some Ladies in Haste' (1908); 'The Firing Line' (1908); 'The Danger Mark' (1909); 'Special Messenger' (1909); 'Ailsa Paige' (1910); 'The Green Mouse' (1910); 'The Adventures of a Modest Man' (1911); 'The Common Law' (1911); 'Blue-Bird Weather' (1912); 'Japonette' (1912); 'The Streets of Ascalon' (1912); 'The Business of Life' (1913); 'The Gay Rebellion' (1913); 'Anne's Bridge' (1914); 'Between Friends' (1914); 'The Hidden Children' (1914); 'Quick Action' (1914); 'Athalie' (1915); 'Who Goes There!' (1915); 'Police!!!' (1915); 'The Better Man' (1916); 'Barbarians' (1917).

CHAMBERS, Talbot Wilson, American clergyman: b. Carlisle, Pa., 25 Feb. 1819; d. New York, 3 Feb. 1896. He was graduated at Rutgers, 1834; studied theology at the Reformed Church Seminary there, and also at Princeton. He was pastor of the Reformed Dutch Church in Somerville, N. J., 1839–49. In 1849 he was installed a pastor of the Collegiate Dutch Church in New York, and remained in association with the Middle Dutch Church congregation until his death. He was a member of the American Bible Revision Committee, and for many years chairman of the committee on versions of the American Bible Society. He wrote 'The Noon Prayer Meeting in Fulton Street' (1857); 'Memoir of Theodore Frelinghuysen' (1863); 'Exposition of the Book of Zechariah' (1874), in 'Lange's Commentary'; 'The Psalter a Witness to the Divine Origin of the Bible' (1875); 'Companion to the Revised Version of the Old Testament' (1885).

CHAMBERS, Washington Irving, American naval officer: b. Kingston, N. Y., 4 April 1856. He was graduated from the United States Naval Academy in 1876. He served on various vessels, and in 1883-84 was in the office of naval intelligence. In 1884 he was a member of the Greely relief expedition and was also engaged in a survey of the Nicaragua Canal route. He became captain in 1908, and was at the War College in 1892–94, and subsequently served as commander of various vessels, was assistant chief of the Bureau of Ordnance in 1907–09, and member of the General Board in 1911, when he became connected with the Bureau of Navigation and was put in charge of the development of aviation.

CHAMBERS, Sir William, English architect: b. of Scottish parents, Stockholm, Sweden, 1726; d. London, 8 March 1796. He was educated at Ripon, in Yorkshire, and while very young went as supercargo to the East Indies, resided for some time in China, and brought back many drawings of Chinese buildings and costume, which were afterward published. He then devoted himself to the study of architecture, and on returning from travels in France and Italy was appointed drawing master to the Prince of Wales, afterward George III. He laid out the royal gardens at Kew in the Chinese style, and built the villa of the Earl of Besborough at Roehampton, in the Italian style, a mansion for Lord Abercorn, near Edinburgh, and houses for Lord Melbourne and the Earl of Gower, at Whitehall and in Piccadilly. His masterpiece was Somerset house in London, which he rebuilt in 1775. He published, in 1759–68, a 'Treatise on Civil Architecture'; in 1772, a 'Dissertation on Oriental Gardening.'

CHAMBERS, William, Scottish publisher and miscellaneous writer: b. Peebles, 16 April 1800; d. Edinburgh, 20 May 1883. He was a brother of Robert Chambers (q.v.). He published 'Things as They Are in America' (1853); 'American Slavery and Color' (1857); 'France: Its History and Revolutions' (1871); 'Stories of Old Families,' etc. In 1859 he bestowed on his birthplace the commodious suite of buildings known as the Chambers Institute, comprising a library, reading-room, lecture-room, art-gallery and museum. Of his native county he published a history in 1864. In 1865 he was elected lord provost of Edinburgh, in which capacity he organized and carried out many extensive and useful measures of sanitary improvement. Between 1871 and 1883 he spent upward of $100,000 on the restoration of Saint Giles' Cathedral, Edinburgh.

CHAMBERS OF COMMERCE, associations formed by tradesmen and merchants for the purpose of protecting and furthering the commercial interests of the community to which the chamber belongs. In America and England the chambers of commerce are voluntary associations with no recognized official functions. In continental Europe chambers of commerce are endowed with official character, and are often vested with administrative functions concerning trade. In some countries it is made their duty to express their opinion in

advance upon proposed legislation, and in the Hanse cities they must by law be consulted before certain kinds of legislation can be considered. Among the various methods employed to promote the ends of such associations are the following: The influence of legislative action for the benefit of commerce; not infrequently legislators engaged in drafting regulations affecting industry seek the views of the more important chamber of commerce, the collection of trade statistics, the gaining of economical or other advantages, by combination, the settlement by arbitration of mercantile disagreements. The oldest body of the nature of a chamber of commerce was started in Marseilles at the close of the 17th century. The value of such bodies became apparent and they sprang up rapidly throughout the civilized world. In mediæval Venice and in the Hanse towns they do not seem to have existed in the sense in which they are understood to-day. The first institution of the kind in the United States, the New York Chamber of Commerce, was organized in 1768 and incorporated by royal charter from King George III in 1770. There are now similar bodies in every city and town of consequence in the United States officered by men of standing in the community, and rendering intelligent and effective service. The oldest chamber of commerce in Great Britain, that of Glasgow, dates from 1783. Edinburgh followed two years later, and for long held a leading position, but the most important British chamber of commerce at the present time is that of London, founded so lately as 1881. It has instituted a series of examinations in commerical subjects, and lectures are delivered under its auspices. Junior and senior commercial certificates are granted after examination to those who display the amount of knowledge required. In 1860 there was formed an Association of Chambers of Commerce of the United Kingdom, which holds annual meetings in London. It includes nearly 100 chambers.

The extension of the functions of chambers of commerce in the United States has been considerable in the decade between 1890 and 1900. The movement had its origin in Germany and grew out of the organized efforts of the last 20 years to foster the world commerce of the empire. The chambers of commerce in leading cities like Berlin and Hamburg undertook the commercial training of young men, with a view to their future advancement in mercantile life and the consular service. The result was the securing of a higher order of talent in such pursuits. The hint thus thrown out was promptly taken up in the United States. The New York Chamber of Commerce, in 1899, voted a fund for the endowment of a lecture course on commerce at Columbia University; in Chicago a chair of commerce was established by that city's chamber at the University of Chicago, and in August 1900 a School of Commerce, Accounts and Finance was established by the University of New York. Students were assured in the event of a satisfactory course of study, that they would be given posts in leading commercial establishments or appointed to consular offices so far as influence could attain that result. The movement is destined to mark a new era in the influence of chambers of commerce.

CHAMBERSBURG, Pa., borough and county-seat of Franklin County, on the Conecocheague and Falling creeks and the Cumberland Valley and Western Maryland and the Philadelphia and Reading railroads, 49 miles west-southwest of Harrisburg. In Early's raid in the Civil War General McCausland entered Chambersburg with Confederate cavalry, 30 July 1864, and demanded a tribute of $100,000 gold; this not being paid the place was set on fire and two-thirds of it burned, causing a loss of $1,000,000. It was soon rebuilt, chiefly of brick or stone, and is now the seat of Wilson College for women, and has an academy, several churches and newspapers, public schools, two national banks and an assessed property valuation of $3,000,000. There are manufactures of hosiery, flour, furniture, wool, dresses, paper, iron, milling machinery, engines, boilers, soap, steam and hydraulic machinery, iron castings, silk, ice and condensed milk; and the shops of the Cumberland Valley Railroad are situated here. The United States census of manufactures for 1914 recorded 59 industrial establishments of factory grade, employing 1,920 persons, of whom 1,649 are wage earners, receiving annually $755,000 in wages. The capital invested aggregated $3,740,000, and the year's output was worth $3,075,000: of this, $1,528,000 was the value added by manufacture. In the environs blue limestone, freestone and marble abound. Its government provides for a chief burgess, elected for three years, and a borough council. Chambersburg was first settled (in 1730) by Benjamin Chambers, an immigrant from Ireland, and was for many years called «Falling Spring.» It was incorporated in 1803. Pop. 12,000.

CHAMBERTIN, shäṅ'bĕr-tăṅ, a superior red Burgundy wine, named after the place where it is produced, in the department of Côte d'Or.

CHAMBÉRY, shäṅ'bā'rē', France, capital city of the department of Savoy, 45 miles south-southwest of Geneva, at the junction of two small rivers, near the Isère, between two mountains on the border of a fertile plain. It is an archbishop's see, and contains a cathedral, six hospitals, a castle, now the prefecture, the palace of justice, barracks, a covered market, a college, a museum and a public library with 40,000 volumes. The old ramparts have been converted into public walks. In its vicinity are excellent baths, much frequented in summer. Its suburbs are large with many fine villas. It has considerable manufactures and distilleries; trade in lace, silk, soap, paper, etc. Chambéry was founded about the 10th century. It was under feudal lords till 1230, when it was ceded to Thomas, 1st Count of Savoy, who built the castle, where the princes of the house of Savoy resided till the government was removed to Turin. The town was surrendered to the French in 1792, and became the capital of the department of Mont Blanc. It was retroceded in 1815, and again ceded to France in 1860. Pop. 22,958.

CHAMBEZI, chăm-bē'zĭ, a river of Africa, rising in the highlands south of Lake Tanganyika, about lat. 9° 40′ S. and long. 33° 15′ E. Its tributaries are large, and form a considerable stream, which flows southwest to Lake Bangweolo.

CHAMBLISS, Charles Edward, American entomologist: b. Petersburg, Va., 20 Aug. 1871. He was graduated at the University of Tennessee in 1892, and from 1894 to 1900 was instructor in zoology and entomology there, and in the same period was entomologist of the Tennessee Agricultural Experiment Station. He was State entomologist of Tennessee 1900–01, when he became associate professor of zoology and entomology at Clemson College and entomologist of the South Carolina Experiment Station and State entomologist 1907–08. Since 1908 he has been agronomist in charge of rice investigations for the United States Department of Agriculture.

CHAMBLY CANAL. See CANADIAN CANALS.

CHAMBLY RIVER. See RICHELIEU RIVER.

CHAMBORD, shäṅ-bôr, **Henri Charles Ferdinand Marie Dieudonné,** COMTE DE, Duke of Bordeaux, French noble: b. Paris, 29 Sept. 1820; d. Frohsdorf, Austria, 24 Aug. 1883. He was the last representative of the elder branch of the French Bourbon dynasty, and was called by his partisans Henry V of France. He was born after the assassination of his father, Prince Charles Ferdinand d'Artois, Duc de Berry. Charles X, after the revolutionary outbreak of 1830, abdicated in his favor; but the young count was compelled to leave the country with the royal title unrecognized by the nation. He lived successively in Scotland, Austria, Italy and London, keeping a sort of court, and occasionally issuing manifestos. In 1846 he married the Princess Maria Theresa, eldest daughter of the Duke of Modena; and in 1851 inherited the domain of Frohsdorf, near Vienna, where for the most part he subsequently resided. While abstaining from violent attempts to seize the crown, he let slip no opportunity of urging his claims, especially after Sedan; but his belief in divine right, and his failure to recognize accomplished facts and modern tendencies, destroyed all chance of his succession.

CHAMBORD, a castle, park and village in central France near Blois, department of Loir-et-Cher. The splendid castle stands in the middle of a park, enclosed by walls extending seven leagues. It contains 440 rooms, 13 large staircases, and stalls for the reception of 1,200 horses. It was built in the Gothic style, by Primatice, for Francis I, and completed under Louis XIV. Here Francis I indulged his inclination for gallantry; here the arts first sprang to life in France; and here King Stanislaus Leczinsky resided for nine years. In 1745 it was given by Louis XV to Marshal Saxe, who died there in 1750. The Emperor Napoleon I gave the domain of Chambord to Marshal Berthier, and in 1821 a company of Legitimists bought it and gave it to the Duke of Bordeaux, son of the Duke de Berry and grandson of Charles X. It was bequeathed to the ducal family of Parma in 1883.

CHAMBRAY, shäṅ-brā, **Georges,** MARQUIS DE, French general: b. Paris 1783; d. 1848. He served in the Napoleonic wars, fell into the power of the Russians, was banished to the Ukraine and not permitted to return to France until after the fall of Napoleon. From 1823 to 1829, he filled high military positions at Vincennes and Perpignan. He wrote various works on military subjects. A second edition of his 'Philosophie de la guerre' appeared in 1835, and a 'Life of Vauban,' written by him, appeared in the 'Plutarque Français.' His most important production is his 'Histoire de l'expédition de Russie,' which appeared in 1837, and has since passed through several editions.

CHAMBRE ARDENTE, shäṅbr är-dänt ("fiery chamber"), an apartment hung with black and lighted with tapers, in which the corpse of a person of distinction is deposited before the funeral ceremonies. The name was formerly given in France to an apartment, similarly draped and lighted, in which sentence of death, frequently by burning, was pronounced on heinous offenders. In a historical sense the term is more especially given to those extraordinary tribunals which, from the time of Francis I, directed the persecutions against heretics, and acted as a sort of inquisition. The members of the tribunal were named by the Pope. They ferreted out heretics, directed the proceedings against them, pronounced sentence, and also saw it carried into execution. A chambre ardente was established by Louis XIV to put a stop to the numerous cases of poisoning which, after the proceedings against the Marchioness of Brinvilliers, were brought before the public. Many persons of the highest rank, among others the Marshal of Luxemburg and Princess Louise of Savoy, were brought before this court, which, however, existed only for two years, and ceased in 1680. The last exercise of its powers was the condemnation of the celebrated sorceress, Voisin. Consult Weiss, 'La chambre ardente' (Paris 1889) and Ravaisson, 'Archives de la Bastille' (Paris 1866–84).

CHAMBRE INTROUVABLE, äṅ-troo-vä-bl ("the chamber whose like is not to be found"), the term applied to the French Chamber of Deputies which met after the second return of Louis XVIII (from October 1815 to April 1816), and which by its fanatic loyalty threatened to plunge France again into anarchy and commotion. Their dissolution met with universal rejoicing. The electoral law of 5 Feb. 1817 prevented the return of a similar chamber.

CHAMECK, chä-mĕk', a species of spider-monkey. See SPIDER-MONKEY.

CHAMELEON, ka-mēl'yŭn or ka-mē'lē-ŏn, lizard belonging to the family *Chamæleontidæ*. The chameleons are generally considered as constituting a sub-order or equivalent primary division of the *Lacertilia* (q.v.). All parts of their anatomy present striking peculiarities. The parietal and squamosal bones of the skull form a bony tripod which supports the conspicuous crest or casque on the posterior part of the head. In many species the strangeness of the physiognomy is enhanced by warts, serrated crests and prominent spines. Trifid teeth are situated on the ridge (acrodont) of the maxillary and dentary bones, but the premaxillary is toothless. The eyelids are almost completely united, leaving only a minute circular orifice through which the animal sees, and which moves with the eyeball in its almost constant rovings. More remarkable still the two eyeballs move quite independently; one may be directed at an object behind while the other views one in

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front. The tongue is club-shaped at the free end and slips into a sheath at the base, from which it can be projected to a distance of more than half the total length of the animal, and return, like a bit of rubber, with great rapidity to its former position. Unique among lizards is the prehensile tail, which rolls downward in a flat spiral and is utilized for clinging to twigs. Serving the same purpose in the arboreal life of the animal are the almost equally peculiar feet, which have five toes arranged in two opposed sets on both fore and hind feet. The lungs are produced into a series of long tubular diverticula, which extend to all parts of the trunk, so that the chameleon is enabled to swell up its body in the fashion of a toad when angry or threatened. These animals subsist entirely on insects caught by the protrusile, somewhat sticky tongue; and are reproduced by eggs laid in the ground.

But the chameleon is most famous for a faculty by no means confined to it, but common to many lizards and other animals — the well-known facility with which it changes its colors. This is accomplished at the will of the animal, or results from the direct influence of external stimuli, by a relatively simple mechanism. The outer portion of the skin or epidermis is transparent; beneath this is a layer of cells filled with granules and oil-drops that appear white or yellow; among and beneath these are large irregular chromatophores, or cells filled with black and red pigment granules. These chromatophores are under the control of the nervous system, and have the power, when appropriately stimulated, of sending out long branching processes filled with pigment into the spaces between and external to the light-colored cells. When this occurs the latter cells are concealed by a pigment curtain and the animal appears dark-colored; when, on the other hand, the chromatophore processes are withdrawn, and the pigment is concentrated in the deeper layers of the skin, the animal appears pale. The rapid play of colors is due to the interchange of these two conditions in varying degrees.

More than 50 species of chameleons are known, belonging to the typical genus *Chamæleon,* and a few others. With the exception of a few species which inhabit Arabia and India, and one whose range extends across the Mediterranean into southern Spain, all are confined to Africa, and a large number of the strangest forms to the island of Madagascar. The common chameleon (*C. vulgaris*) inhabits the shores of the Mediterranean and Asia Minor, and through being so well known to Europeans, has made the peculiarities of these lizards almost proverbial.

In the United States the name chameleon is commonly applied to a lizard (*Anolis carolinensis*) and its allies, belonging to a quite different group, a genus of the family *Iguanidæ.* Like its African namesake it changes its colors with great facility. (Consult *Proceedings* Amer. Acad. Arts and Sciences, XL, 10, 1904). It may be bright green, yellowish-gray, rich brown, or almost black, and the male is peculiar in having beneath the throat a pouch of elastic skin which can be inflated by means of a pair of delicate bony rods belonging to the skeleton of the tongue, when it appears of a flaming orange or vermilion color. They are dainty, smooth-bodied little animals, and are chiefly arboreal, jumping from twig to twig in pursuit of insects with an activity that contrasts strongly with the sluggishness of the European chameleon, which depends upon its projectile tongue to secure its game. *Anolis carolinensis* is the only member of the genus which enters the United States, and is quite common in Florida and other southern States, from which many were shipped to the North a few years ago to supply the requirements of a silly fashion in vogue at that time of wearing one of these pretty lizards secured to the dress by a tiny golden chain about its neck. Owing to the ignorance of the wearers, many of the chameleons quickly succumbed to thirst, as they, in common with most lizards, require a constant supply of water. Consult Gadow, 'Amphibia and Reptiles' (New York 1911); Ditmars, 'The Reptile Book' (New York 1907); Pycraft, 'Story of Reptile Life' (London 1905).

CHAMELEON, a southern constellation containing nine stars, lying within the Antarctic polar circle.

CHAMELEON MINERAL, manganate of potassium, so called because a solution of it changes from green, through a succession of colors, to a rich purple.

CHAMFORT, shän'fôr', **Sébastien-Roch Nicolas,** French revolutionist: b. Auvergne 1741; d. 1794. He left school to become an abbé, but refused a benefice. For a time, his efforts to publish his works were unsuccessful. He finally made his début as a litterateur under the name of Chamfort, and obtained some success as a dramatist and as a critic, which procured him a place in the French Academy, a pension and a place at court. An independent and somewhat misanthropic spirit made him, however, in spite of his interest, favor the Revolution, of which he became the epigrammatist. He resigned his employment at court, and took the literary editorship of the *Mecure de France.* He won several academic prizes, as on his essays on Molière and La Fontaine. The King added 1,200 livres to his pension and the Prince de Condé made him his secretary, a post which he found uncongenial to his Bohemian tastes. He withdrew to Auteuil, and thence to Holland, but returned and became a member of the Academy in 1781. An unfortunate love affair made him quit the court, but he gathered about him at the house of M. de Vaudreuil a congenial circle which included Mirabeau. He furnished Sièyes with the idea and the title of his famous pamphlet 'Qu'est-ce que ce Tiers-État?' and forged such popular watchwords as: Guerre aux châteaux, paix aux chaumières ("War to the castles, peace to the cottages"). He was employed by Roland in the National Library and published the first 26 'Tableaux Historiques de la révolution.' Threatened with imprisonment, he endeavored to blow out his brains. Though not immediately fatal, the wounds he inflicted on himself ultimately caused his death. His poetry has now little reputation. His best work, 'Mustapha and Zeangir,' at which he labored for 15 years, exhibits him as a feeble follower of Racine and Voltaire. It is praised for purity of style and mildness of sentiment; but, as a French critic pungently observes, he reserved all his mildness for his tragedies. A collection of 1,800 *bon mots,* under the title 'Chamfortiana,'

is now considered the best memorial of him. His 'Œuvres completes' is in five volumes (1824–25); a selection from his writings appeared as 'Œuvres de Chamfort' (1852 with a critical preface by Houssaye). In 1879 appeared 'Œuvres Choisis' (2 vols., with preface and notes by M. De Lescure). Consult Sainte-Beuve, 'Causeries du Lundi' (Vol. IV, Paris 1857–62); Pelisson, 'Chamfort' (Paris 1895).

CHAMIER, shā-mēr', **Frederick,** English novelist: b. London 1796; d. 1870. He entered the navy in 1809, took part in the last campaigns against the French and distinguished himself in the American War of 1812. He retired in 1833 with the rank of captain, and living at Waltham Hill, acted as a justice of the peace for the counties of Hertford and Essex. He imitated Captain Marryat in making his experience of a sea life the basis of a series of romantic tales, but did not equal him in humor and imagination. He has, however, been credited with great fidelity to nature. His principal works are 'The Life of a Sailor' (1834); 'Ben Brace' (1835); 'The Arethusa' (1836); 'Jack Adams' (1838); 'Tom Bowling's Log' (1839). He also published a review of the scenes witnessed by him in the revolution of 1848, in which his prejudice against some of the leading participants obscures the veracity of his statements.

CHAMINADE, shā-mē-nād, **Cécile Louise Stéphanie,** French composer: b. Paris, 8 Aug. 1861. She studied at Paris under Le Coupey, Savard, Marsick and Benejamin Godard; soon acquired a high reputation as a pianist, and played at concerts in Paris, Berlin, Vienna, London, Constantinople and other cities. She visited the United States in 1908 and made a successful tour, but has not maintained her hold on the public. She has resided in England for a number of years. Her compositions, which are widely known, include 'Callirhoë,' a ballet symphony performed with great success at Marseilles (1888), Lyons (1889), and Bordeaux (1901); 'Les Amazones'; 'Ménétriers'; 'Au Matin'; and a number of songs, among which are 'Madrigal'; 'Chanson Slave'; 'Ritournelle'; 'Fleur de Matin'; and 'Sans Amour.' She has also written a concertstuck for piano and orchestra, two trios and a large number of works for piano solo, piano and violin, etc.

CHAMISSO, shā-mēs'sō, **Adelbert de** (properly Louis Charles Adelaide de Chamisso de Boncourt), German poet and naturalist: b. at the castle of Boncourt, Champagne, 27 Jan. 1781; d. Berlin, 21 Aug. 1838. When a boy his family were driven by the breaking out of the Revolution to seek an asylum in Berlin. On the Peace of Tilsit he returned with his family to France, and in 1810 was appointed professor in the Lyceum of Napoleonsville; but shortly after returned to Prussia, and during three years devoted himself enthusiastically to the study of natural science at Berlin. Count Romanzoff having in 1815 fitted out a vessel, under the command of Otto von Kotzebue, for the discovery of the northwest passage, Chamisso accepted the appointment of naturalist to the expedition, and added greatly to his store of scientific knowledge. He afterward took up his residence at Berlin, was appointed superintendent of the botanic garden and received the diploma of doctor from the university for the collections in natural history which he had presented to the museum. His abilities as a naturalist are displayed in his work 'De Animalibus quibusdam e Classe Vermium Linnæi' (1819); and his 'View of the Most Useful and the Most Noxious Plants of North Germany, with Remarks on Scientific Botany.' In 1827, partly for the purpose of rebutting the charges brought against him by Kotzebue, he published 'Views and Remarks on a Voyage of Discovery,' and 'Description of a Voyage Round the World.' Both works display great accuracy and industry. His last scientific labor was a tract on the 'Language of Owyhee.' His reputation as a naturalist has been somewhat eclipsed by that which he acquired as a poet. As early as 1804–06 he, in concert with Varnhagen von Ense, published a collection of poems, under the name of the 'Muses' Almanac'; and in 1813 appeared his celebrated and most original tale, 'Peter Schlemihl,' which has been translated, among other languages, into English, and admirably illustrated by Cruikshank. His poetry is marked by vigor, correctness and a thorough command of the German language; but is in general of a gloomy and terrific cast. He is the author, however, of several humorous pieces; and his political poems are distinguished by caustic, yet wholesome, raillery. Many of his ballads and songs are masterpieces of their kind. (See Peter Schlemihl's wundersame Geschichte). Consult Geiger, 'Aus Chamissos Frühlingzeit' (Berlin 1905); Hitzig, 'Leben und Briefe von A. von Chamisso' (1839); Fulda, 'Chamisso unde seine Zeit' (Leipzig 1881); Kossmann, 'Der deutsche Musenalmanach, 1833–39' (The Hague 1909); Raymond, 'A von Chamisso als Naturforscher' (ib. 1889).

CHAMOIS, shăm-wä or shăm'ĭ, a horned animal (*Rupicapra tragus*) classed among the goat-antelopes, and native to the mountains of middle and southern Europe from the Pyrenees to the Caucasus and Georgian Mountains, and as far east as Persia. The chamois found in the Pyrenees and in the Caucasus differ in local peculiaries from the Tyrolese, which is the race-type. This is about the size of a goat; but its neck is somewhat longer in proportion than that of the goat and is more graceful. The general color is brown; the head pale, almost yellow, with a dark marking on each cheek; the nails black. The short black horns rise straight from the forehead, and are recurved at the tip. The chamois may be found in summer, in the highest Alpine altitudes, close to, and indeed beyond, the snow-line. In winter it seeks the forests, where it is somewhat protected. In the Alps, where they have been much hunted, the herds are small. The chamois is now rare in Switzerland. The breeding season is in May and June. The chamois is famous for its agility. The creature is timid; and when feeding in flocks, one is always on the watch to announce danger by a peculiar whistling noise. Chamois-hunting as a sport is almost impossible in the Alps, as the numbers have been so reduced by continuous hunting that the remaining ones are protected by law — only a few being annually at the disposal of the hunter; but in the Carpathians and eastward the sport is not restricted. Chamois leather is valuable

commercially for its softness and warmth. (See LEATHER). Ordinary "chamois leather," however, is prepared from sheep-skin or goat-skin. The flesh of the chamois is esteemed a table delicacy. The horns are used for ornamental purposes, especially in making souvenirs of Alpine tourist resorts.

CHAMOMILE, or **CAMOMILE** (*Anthemis nobilis*), a plant belonging to the family *Asteraceæ*. It is an herb with slender, trailing, hairy and branched stems. The leaves are doubly pinnate, with linear pointed pinnæ. The head of flowers is white, with a yellow centre. Both leaves and flowers of this plant have a strong though not unpleasant smell, and a very bitter nauseous taste; but the flowers are more bitter and aromatic than the leaves. Chamomile enjoys a wide, popular reputation as a diaphoretic and diuretic. The flowers are usually made into an infusion or tea and this is drunk while hot. A poultice is also made of the flowers and applied to painful swellings, such as rheumatic joints, or earache, boils, etc. There is a large amount of fixed and volatile oil in chamomile to which its useful physiological and physical properties are due. Volatile oils act as vaso dilators and antispasmodics, diuretics and diaphoretics, the fixed oils permitting of long-continued heat. Chamomile flowers are sometimes used by brewers as a substitute for hops. Distilled with water, an essential oil in small quantities is obtained, of a greenish color and strong pungent taste. So fragrant is the chamomile plant that the places where it grows wild may easily be discovered by the somewhat strawberry-like perfume emitted when it is trodden on. This quality has sometimes induced its cultivation for a green-walk in gardens. Chamomile in the United States is an importation from Europe. Two other closely related plants of the same genus, May-weed or dog-fennel (*A. cotula*) and corn chamomile (*A. arvensis*), both natives of Europe, are widely naturalized as weeds in North America.

CHAMOND, Saint. See SAINT CHAMOND.

CHAMORE'RIL, a lake with apparently no outlet, in Middle Tibet, on a plateau 15,000 feet above the sea, between the upper waters of the Sutlej and the Indus. It is surrounded by mountains some 5,000 feet in height, from which it receives much water. Its length of 15 miles and width of two and one-half are pretty constant. On account of its great depth it freezes only in winter.

CHAMOUNI, shä-moo-nē, or **CHAMONIX**, shä-mō-nē, derived from *champs munis* or Lat. *campus munitus*, fortified grounds, in allusion to the natural mountain fortifications, a celebrated valley of southeastern France, in the department of Haute-Savoy, in the Pennine Alps, fully 3,000 feet above sea-level. It is about 12 miles long, and only about half a mile wide; lies southwest to northeast, its east side formed by Mont Blanc and other lofty mountains of the same range, and its west side by Mount Brévent and the Aiguilles Rouges. It is traversed in its whole extent by the Arve, which leaves the valley by a narrow gorge at the southwest end, through which also passes, high above the river, the highway to Sallanches and Geneva. At its north end the valley communicates with Canton Valais by two roads and a bridle-path, the latter crossing the Col de Balme; and it may also be left by other passes, as the Col du Géant, but they are difficult and dangerous, and only suited for practised and daring pedestrians. The mountains on the west side of the valley, though attaining a height of 8,500 feet above sea-level, are not covered with snow in summer; but those on the east side, in the range of Mont Blanc, being from 10,000 to upward of 15,000 feet high, are always snow-clad, excepting where the peaks are too perpendicular for snow to lie. From the snowy range proceed the glaciers, some of which approach close to the cultivated fields. They are very numerous, and of different sizes; but the two most important are the Glacier des Bossons and the Mer de Glace, the latter one of the largest glaciers in the Alps. From its lower extremity, called the Glacier des Bois, the meltings of the glacier flow off, in greater or less volume according to the season of the year, from under a naturally formed ice-arch, the source of the Arveyron, the name given to the stream thus formed, which is an affluent of the Arve. The lower slopes of the mountains are covered with timber, through which is frequently to be seen the devastating course taken by the avalanche. The soil is not fertile, but it is assiduously cultivated; and the inhabitants, who are gathered together in numerous villages, of which Chamouni or Le Prieuré is the chief, raise barley, oats, spelt, flax, potatoes, etc., raise cattle and keep bees. During the winter, yarns, cloths, hats and implements are made, and many articles of wood are carved. All the valley is famous for its scenery, which was first brought to public notice by Windham and Pococke, two Englishmen who visited it in 1741. It presents various points from which the whole mass of Mont Blanc may be seen at one view. The village of Chamouni (3,415 feet), 39 miles east-southeast of Geneva, originated in a Benedictine priory founded about 1090. It has several hotels, and is supported mainly by visitors to the scenery of the valley. The ascent of Mont Blanc is most commonly made from this village. There is a monument to De Saussure, who did much to bring the valley before the notice of travelers. Pop. 2,850.

CHAMP CLOS, shäṅ klō (Fr. "a closed-in field or area"), formerly a place set apart for duels between those who wished to determine, in that manner, either a lawsuit or dispute of honor. This name was also given to the place set apart for tournaments.

CHAMP DE MARS, shäṅ-dė-märs, Paris, extensive area, on the left bank of the Seine, between the Seine and École Militaire, which originally formed a place of exercise for the young men in the military school, and subsequently has been the scene of various public festivals and great gatherings of people. It is 1,093 yards long, 537 wide with four rows of trees on each side. Louis XVI and his family took part here, in 1790, in the great Fête de la Fédération, in which the King swore to defend the new constitution; in June 1794, it was the scene of the Fête de l'Etre Suprême. In 1815 Napoleon selected the Champ de Mars for the scene of a general assembly of the French

people, at which he placed before the representatives of the nation the articles of a supplementary constitution, called the *Acte additionnel,* intended to establish the legality of his throne. It has also been the site of international expositions of 1867, 1878, 1889 and 1900. See PARIS.

CHAMP DE MARS, (Latin *Campus Martius*), and **CHAMP DE MAI,** shăn-dĕ-mā, the annual public assembly of the Franks. They were held originally in March and called from the place of meeting Champs de Mars; in the 8th century they were transferred by Pepin, the father of Charlemagne, to the month of May, and called the Champs de Mai. At the Champs de Mai, all questions relating to public affairs, such as war, peace, the enactment of laws, were decided by the majority. These assemblies were held irregularly under the Merovingians, but became more frequent and systematic under the first Carlovingians. Pepin called together only the nobility and the clergy; but Charlemagne ordered that every count should bring with him 13 men from his jurisdiction, to represent the people in the General Assembly. The first descendants of Capet departed from this usage; but Philip IV, who reigned from 1285 to 1314, restored the third estate by calling together delegates from the cities.

CHAMPAC. See CHAMPAK.

CHAMPAGNE, shăn-pān-yę, or **CHAMPAIGNE, Philippe de,** Flemish painter: b. Brussels, 26 May 1602; d. Paris, 12 Aug. 1674. He went to Paris at the age of 19, and worked on the decorations of the Luxembourg under Duchesne; he was later appointed court painter by Marie de Medicis. He was also a member and finally rector of the Academy of Painting and Sculpture. His coloring is excellent and his portraits possess great merit. His best pictures are at Vincennes and at Paris; among them are a portrait of himself, a portrait of Richelieu, 'The Apostle Philip,' and 'The Last Supper,' all in the Louvre.

CHAMPAGNE, chăm-pān' (Fr. shăn-păñ-yę), France, an ancient province which before the Revolution formed one of the 12 great military governments of the kingdom. The name Champagne, formerly Champaigne, is derived from the vast plains (Lat. *campus,* "a plain") which occupy the territory. Champagne was bounded on the north by Hainaut and the bishopric of Liége; on the east by the duchy of Luxembourg and Lorraine; on the south by Franche-Comté and Burgundy; and on the west by L'Orléanais, L'Isle de France and Picardie. It forms at present the departments of the Marne, Haute Marne, Aube, Ardennes and part of those of the Yonne, the Aisne, Seine-et-Marne and Meuse. The land is fertile, and produces the celebrated wine called after its name. In the Middle Ages it was a countship of which Troyes was the capital, and was united with France when Louis Hutin, Count of Champagne, succeeded to the throne of France under the title of Louis X in 1314.

CHAMPAGNE, a French wine made chiefly in the department of the Marne, in the former province of Champagne. It is commonly divided into river and mountain wines (*vins de la rivière de Marne,* and *vins de la montagne de Rheims*), the former being for the most part white, the latter red. Not all of these wines are sparkling or frothing, though by the name "champagne" is generally understood such wine as has been subjected to an imperfect fermentation, and contains a quantity of carbonic acid gas, generated during the insensible fermentation in the bottle, this gas being disengaged on removing the pressure by which it was detained in solution. The briskest wines are not always the best; they are, of course, the most defective in true vinous quality, and the small portion of alcohol which they contain immediately escapes from the froth as it rises on the surface, carrying with it the aroma, and leaving the liquor that remains in the glass nearly vapid. Hence the still or the creaming or slightly sparkling Champagne wines (*vins crémants* or *demi-mousseux*) are more highly valued by connoisseurs and bring greater prices than the full-frothing wines (*vins grand-mousseux*). By icing these wines before they are used the tendency to effervesce is in some degree repressed; but when they are kept cool this precaution is unnecessary. In general, it may be observed that the vineyards on the banks of the Marne supply the choicest wines, and that the quality degenerates in proportion as they recede from the river. Among the white wines of Champagne the first rank is generally assigned to those of Sillery, the produce of the vineyards of Verzenay, Mailli, Raumont, etc. Of the Rheims Mountain wines those of Verzi, Verzenay, Mailli, Bouzy and Saint Basle are most esteemed; but the Clos Saint Thierry furnishes perhaps the finest red champagne. The soil of the principal vineyards throughout Champagne is composed of a loose marl resting on chalk and sometimes mixed with flints. For the manufacture of the white Champagne wines black grapes are now generally used. In making the red wines the grapes are trodden before they are introduced into the vat. Champagne, when well made, and placed in cool cellars, will retain its good qualities from 10 to 20 years. See WINE AND WINE MAKING.

CHAMPAGNY, shăñ-păñ-yē, **Jean Baptiste Nompère** (nŏñ-pā) **de** (DUKE DE CADORE), French naval officer, diplomatist and politician: b. Roanne, 4 Aug. 1756; d. Paris, 3 July 1834. He entered the navy in 1780, and was a member of the States-General, National and Constituent Assemblies. Thrown into prison in 1793, he was released after the 9th Thermidor (1794), and became councillor of state. He was employed by Napoleon as Ambassador to Vienna, and as Minister of the Interior and of Foreign Affairs, and he negotiated the marriage with Marie Louise. After Napoleon's downfall he transferred his allegiance to the Bourbons, under whom he was restored to the Chamber of Peers.

CHAMPAIGN, shăm-pān', Ill., a city in Champaign County, on the Illinois Central, the Cleveland, Cincinnati, Chicago and Saint Louis and other railroads, 48 miles southeast of Bloomington. It is the trade centre of the richest agricultural county in the State. It has an ice and cold storage plant, railroad shops, extensive foundries and tool and textile factories. It is the twin town of Urbana,

which contains the University of Illinois, and it has a fine public library, several parks and a high school. Settled in 1855, it was incorporated in 1860. Its government is administered by a mayor, elected biennially, and a city council. The electric-light plant is owned by the city. Pop. (1910) 12,421.

CHAMPAK, chŭm'păk, an East Indian tree (*Michelia champaca*), of the natural order *Magnoliaceæ*. It has large axillary flowers of a deep yellow color, and very fragrant, which are much celebrated in Hindu poetry. The tree is sacred to Krishna, and the women of India adorn their hair with its blossoms. The bark has tonic properties.

CHAMPE, chămp, **John,** American soldier: b. Loudon County, Va., 1752; d. Kentucky about 1798. He was selected by request of Washington to go to New York as a deserter and spy, and if possible to seize and bring off Arnold in time to save the life of André. Champe undertook the enterprise with courage, passed the American lines with difficulty, was hotly pursued by his comrades as a deserter, reached New York, underwent an examination before Sir Henry Clinton, and by him was consigned to General Arnold, who gave him in the British army his former rank. He discovered the custom of Arnold to walk in his garden at a late hour every night, formed a plan with a comrade to seize and gag him there, and to take him between them as a drunken companion to a boat on the Hudson, whence arrangements were made for his transportation to the American headquarters. On the appointed night Arnold failed to appear in the garden, and Champe, after waiting for him till near morning, returned with deep chagrin to his position in the British army. It proved that Arnold had the day before changed his quarters, preparatory to the embarkation of his troops for Virginia. There was nothing left for Champe but to embrace the first opportunity to escape to the American army, which he did soon after landing in Virginia, and joined the troops under General Greene. Washington discharged him from further service, lest, falling into the hands of the enemy, he should be immediately put to death. He died before Washington could reward him for his services.

CHAMPEAUX, shäṅ-pō, **Guillaume de,** French philosopher: b. Champeaux, about 1050; d. 1121. He was so called from the place of his birth. He studied at Paris under Anselme, De Laon and Manégolde, and afterward himself opened a school there, in which he had numerous pupils. The schools opened by De Laon and Champeaux are regarded by Pasquier as the origin of the University of Paris. Among the pupils of Champeaux were Robert de Bethune, one of the most distinguished prelates of the age, and still more famous, Abelard. Jealous of the younger man's acumen he retired from his school and founded in 1113 the abbey of Saint Victor. A few months later he was made bishop of Châlons. He defended the doctrine of realism against the nominalism of Abelard; but it is only in the works of Abelard that any record of their contention remains. Champeaux has left a treatise on the origin of the soul, 'De Origine Animæ,' in which he examines the question how children dying without baptism are justly damned, which he concludes by referring to the unfathomable judgments of God. The only other work of his which has been printed is 'Moraiia Abbreviata.' He is considered the first prominent dialectitian of the realist sect. Consult Haureau, B., 'De la philosophie scolastique' (2 vols., Paris 1850); Cousin, V., 'Fragments de philosophic scolastique' (in 'Introduction aux ouvrages inédits d'Abélard,' Paris 1884); Michaud, E., 'Guillaume de Champeaux et les écoles de Paris au XIIe siècle' (after the unedited documents, Paris 1867, 2d ed., 1868).

CHAMPERTY, or **CHAMPARTY** (Lāt. *campi partitio,* "a division of lands"), in law, a bargain with the plaintiff or defendant in any suit to have part of the land, debt or other thing sued for, if the party that undertakes the suit prevails therein, the champertor carrying on the party's suit at his own expense. It is a species of maintenance, and is generally held to be illegal both in courts of common law and equity; but in some of the States of this country such agreements are recognized by law, and the tendency is toward freedom of action in these as well as other contracts. See MAINTENANCE.

CHAMPFLEURY, shäṅ'flē'rē', pseudonym of JULES FLEURY-HUSSON, French novelist and miscellaneous writer: b. Laon, 10 Sept. 1821; d. Sèvres, 5 Dec. 1889. His story of 'Chien-Caillou' was in Victor Hugo's opinion a masterpiece of realistic description. He wrote an autobiographical novel of his youthful years in 'Les confession de Sylvius' (1849), continuing the story in 'The Adventures of Mariette' (1856). But his 'Les bourgeois de Molinchart' (1855), a satiric delineation of the provincial bourgeoisie, made him famous. He is a pronounced "realist." He compiled a 'General History of Caricature' (5 vols., 1865–85), with a supplementary volume, 'Secret Museum of Caricature' (1888); and a work on the arts of design and ceramics, 'Bibliographie céramique.' Consult Troubat, 'Souvenirs pur Champfleury et le Réalisme' (Paris 1905).

CHAMPIER, shäṅ-pē-ā, **Symphorien,** French historian: b. Saint Symphorien-le-Loise, Lyonnais; d. Lyons about 1540. Famed as a physician, with powerful friends at court and an ample fortune, he took delight in literature and the society of literary men, himself writing a series of poems for 'Virtuous Ladies' (1503), in four divisions, entitled 'The Flower of Dames,' 'The Rule of Love,' 'The Prophecies of the Sibyls' and 'The Book of True Love,' respectively. His best history is an account of 'Princes and Battles' (1502).

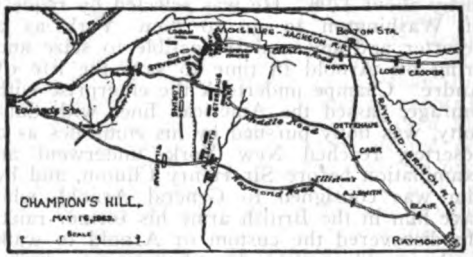
CHAMPIGNON, shäṅ-pē-ñoṅ, the French name for the common mushroom (*Agaricus campestris*). See AGARIC.

CHAMPION, one who undertakes to defend, in combat or by argument, another person, a doctrine or a cause. In the rudest state of society men avenge their own wrongs without restraint. The first step commonly made toward a better state of things in the rude beginnings of political society is to confine this right within certain bounds, and allow it to be exercised only with certain formalities. This

was done by the feudal institutions of Europe, which recognized in many circumstances, under the toleration of the Church itself, the right of private combat. In some countries, however, particularly in England, the legal recognition of the right of combat had this injurious effect, that the practice became so settled as to be allowed to continue even after more rational ideas had grown up on the subject of the administration of justice. The combat, after it had become a common means of settling disputes, was not always waged by the contending parties. This was the case, indeed, in appeals of felony, and if the heir, either from sex or age, was incapable of "waging his battle," as it was called, the question was left to a more rational mode of settlement. But in the writ of right, the last and most solemn decision respecting real property, the tenant was required to produce his champion, who threw down his glove as a challenge to the champion of the demandant, and the latter, by taking it up, accepted the challenge. The laws authorizing judicial combat, though fallen into disuse, continued to disgrace the English statute-book till 1819. Even the right to the English crown was in some degree put in issue by appeal to judicial combat; and the appearance of a champion offering battle to any one who gainsays the right of the king to the crown was till recently a part of the ceremonial of an English coronation. This office was for four centuries hereditary in the family of Dymoke, of Lincolnshire. The champion's function was to ride into Westminster Hall in full knightly armor, throw down his gauntlet and proclaim his readiness to defend the title of the sovereign to the crown against any one disputing it. The last exercise of the office was at the coronation of George IV.

The term "champion" is also used in the realm of athletics to designate one who is preeminent in a certain branch.

CHAMPION'S HILL, Battle of. On 30 April 1864, General Grant crossed to the east side of the Mississippi River at Bruinsburg, 32 miles in a direct line below Vicksburg. On 1 May he marched to Port Gibson, defeating a Confederate force under Gen. J. S. Bowen. This turned the position at Grand Gulf, and on the 3d Grant reached Hankinson's Ferry; then, after bringing up supplies, marched northeast to interpose between the Confederates, under Gen. J. C. Pemberton, in and near Vicksburg, and those at Jackson, the capital of Mississippi, 40 miles east of Vicksburg. The battle of Raymond was fought and won on the 12th, and on the 14th Gen. Joseph E. Johnston was attacked, defeated and driven north from Jackson, Grant occupying the place. Learning from an intercepted dispatch, one of three sent by Johnston to Pemberton, on the 13th, that Pemberton had been advised to march with all his available force on Clinton, 10 miles west of Jackson, and attack Grant's rear, while Johnston operated on his front or flank, Grant, leaving Sherman with two divisions at Jackson to destroy all public property and manufacturing establishments, turned the rest of his army from Clinton, Raymond and Auburn, on Bolton and Edwards' Station, on the Vicksburg and Jackson Railroad, the nearest points where Johnston could unite forces with Pemberton, and at night of the 15th the various divisions were near their designated positions. Pemberton, with the three divisions of C. L. Stevenson, J. S. Bowen and W. W. Loring, was near Big Black River on the 14th when he received one of the triplicate dispatches sent by Johnston on the 13th. Anxious to hold Vicksburg and the line of the Big Black, 13 miles east, he questioned the wisdom of acting upon Johnston's suggestion and called a council of his leading officers, a majority of whom agreed with Johnston; but he adopted the suggestion of Loring and Stevenson, to move on Grant's rear in the direction of Raymond and advanced on the 15th for that purpose, Loring's division halting at night on the Raymond road at Elliston's, eight miles east of Edwards' Sta-



tion, the other divisions farther north on roads coming into the Raymond road. Early next morning the march was resumed, but the head of column had scarcely left camp when Pemberton received a dispatch from Johnston that he had been driven north from Jackson, and advising that he move directly on Clinton, and inform him of the movement, that he also might move to that point with 6,000 men. Pemberton concluded to make the movement. He immediately turned back his trains to Edwards' Station to get the road leading to Brownsville on the north, and had scarcely done so, when Osterhaus' and Smith's divisions of Grant's army made their appearance on the Raymond road and attacked his skirmishers, upon which he suspended his movement to join Johnston. Continuing the reversal of his trains to the rear, he formed for battle on the general line of a cross-road, connecting the Raymond and Clinton roads, Loring on the Champion's Hill, about 60 to 70 feet above the general level of the country, covering the Clinton road and the intersection of the cross-road. Stevenson formed line while heavy skirmishing was going on to his right. Pemberton had about 17,500 men. The position of Grant's army on the night of the 15th was as follows: Hovey's division was at Bolton on the Clinton road; Logan's and Crocker's were on the same road a few miles in Hovey's rear; Osterhaus' was on a cross-road, half-way from Raymond to right, covering the Raymond road, Bowen in the centre and Stevenson on the left on the northern point of a narrow ridge, known as Bolton; Carr's a short distance in his rear; and the divisions of A. J. Smith and Blair were west of Raymond on the Edwards' Station road. These seven divisions numbered about 32,000 men, on the three roads converging on Edwards' Station, and known as the Raymond road on the south, the middle road and the Clinton road on the north. Early on the morn-

ing of the 16th, Grant, who was at Clinton, heard that Pemberton was marching to attack him, upon which he sent orders for MacPherson, with the divisions of Logan and Crocker, to close up rapidly on Hovey, and for the four divisions under McClernand on the Raymond and middle roads to move forward cautiously and establish communications with each other. He then hastened by the Clinton road to the front. A. J. Smith, advancing on the Raymond road, attacked and drove in Loring's skirmishers about 8 o'clock, and Osterhaus on the middle road engaged those in his front, artillery was brought up and opened fire, but McClernand, who was in command of the four divisions, more than half the army on this part of the field, doubtful if Grant wanted him to bring on a general engagement, deferred attack until 2 P.M., when he received Grant's order to attack, upon which he ordered Smith and Osterhaus to attack vigorously and "press for victory," but the attack was not a vigorous one, and meanwhile the battle was being fought out and decided on the right, on Champion's Hill. Hovey, advancing on the Clinton road, began skirmishing with Stevenson about 10 o'clock and began to form line for a general attack, but was directed by Grant to wait until McClernand could be heard from. Logan came up at 11 o'clock; nothing had been heard from McClernand and line was formed for a general attack, Hovey south of the Clinton road and Logan on his right. It was about noon when Hovey advanced with great spirit, climbed Champion's Hill and attacked; finally, after a hard contest with varying success, driving back the right of Stevenson and capturing 11 guns, soon after which Logan, who had worked around on Stevenson's left, on the north side of the hill, attacked and drove back Stevenson's left and captured seven guns. The positions thus gained were held until 2 o'clock. Meanwhile Stevenson, who had been compelled to take ground to the left to meet Logan's flank movement and cover the road to Baker's Creek and Edwards' Station, had induced Pemberton to draw Bowen to the left and close the interval between the two divisions and Loring was ordered to close in on Bowen. It was after 2 o'clock when Bowen closed in on Stevenson and his two leading brigades, F. M. Cockrell's and Green's, attacked Hovey furiously and drove him back down the hill, Hovey contesting every foot, but forced to abandon nine of the captured guns. As Hovey fell back two brigades of Crocker's division came to his support, and the Confederates were checked. Artillery was now massed and poured such an effective enfilading fire upon Stevenson's line that it was much shaken, and Hovey and Crocker again charged up the hill, driving Stevenson and Bowen, after a desperate resistance, before them; and Pemberton, seeing his left entirely broken, at 3 o'clock gave the order for a general retreat, which he ordered Loring to cover. Before this, Loring, leaving Gen. Lloyd Tilghman's brigade on the Raymond road to oppose Smith and Blair, had already with two brigades nearly closed up on Bowen, and when the retreat began was forming his men between the Clinton and Raymond roads, when he was attacked by Osterhaus, and soon gave way, falling back to the Raymond road. Meanwhile A. J. Smith had advanced on the Raymond road, defeated and killed Tilghman. Loring reunited his command and retreated on the Raymond road, but when he came to the ford of Baker's Creek he found it in Union possession, upon which, after vain effort to find a crossing lower down, and realizing that he had been cut off from Pemberton's army, he moved off to the south, abandoning his artillery, and on the 19th joined Johnston, who meanwhile had reoccupied Jackson. Stevenson's and Bowen's men retreated to the Big Black, Grant following as far as Edwards' Station, where darkness ended the pursuit. Grant says he fought the battle with about 15,000 men actually engaged in four hours of hard fighting, preceded by two or three hours of skirmishes, some of which rose almost to the dignity of battle. The Union loss was 410 killed, 1,844 wounded and 187 missing. The Confederate loss was 380 killed, 1,018 wounded, 2,441 missing and 24 guns taken. Grant pursued next day, the 17th, defeated Pemberton at the Big Black and on the 19th invested Vicksburg. Consult 'Official Records' (Vol. XXIV); Green, 'The Mississippi'; Grant, 'Personal Memoirs'; The Century Company's 'Battles and Leaders of the Civil War' (Vol. III).

E. A. CARMAN.

CHAMPLAIN, shăn-plăn or shăm-plān', **Samuel de,** French navigator, colonizer and soldier: b. Brouage, Saintonge, about 1570; d. Quebec, 25 Dec. 1635. In early life he served in the army of Henri IV, as quartermaster of cavalry, but in January 1599 he sailed as captain of the *Saint Julien* to the West Indies, Mexico and Panama. On his return (1601) he prepared a record of this cruise, with charts, etc., which is preserved in manuscript form at Dieppe. An English translation was published in 1859, and it appeared in the original in 1870. In March 1603 he sailed for North America, and explored, by boat, the Saint Lawrence River up to the Falls of Saint Louis, and down to Gaspé, and published a small book describing his voyage. In May 1604 he sailed with De Monts along the shores of Nova Scotia, wintered on the island of Saint Croix and founded a colony at Port Royal. From 1604 to 1606 he made careful surveys and charts of the coast as far as Cape Cod. He revisited France in 1607, but sailed again in 1608, and founded Quebec, which, owing to the development of its fur-trade, rapidly increased in size. In 1609 he accompanied an Algonquin and Huron expedition against the Iroquois, and thereby discovered Lake Champlain, on the borders of which the Iroquois were defeated. From September 1609 to March 1610 he was engaged in bringing over French mechanics for his colony. In 1611 he established a trading-post at the present site of Montreal. He became lieutenant-governor of New France, 8 Oct. 1612; accompanied a band of Indians against the Iroquois, traversing a large part of the present State of New York; fortified Quebec in 1620, but was compelled in 1629 to surrender to an English fleet, and was taken to England. Released in 1632, he sailed again for New France, with three well-equipped vessels, and spent his last years in the government and development of the French colonies. A complete edition of his works was published in 1870, Laverdière and Casgrain being the

editors. An English translation by Charles Otis, with a memoir by E. F. Slafter appeared in Boston (3 vols., 1878–82). Consult 'Voyages of Samuel de Champlain, 1604–18' (New York 1907); Parkman, 'Pioneers of France in the New World' (Boston 1865); Sedgwick, in 'Riverside Biographical Series' (Boston 1902); Colby, 'Canadian Types of the Old Régime' (1908).

CHAMPLAIN, Lake, a body of water chiefly in the United States, between the States of New York and Vermont, but having its northern end six miles within the Canadian boundary, in the province of Quebec. Its extreme length, north to south, is about 125 miles; breadth, from half a mile to 15 miles; area, about 600 square miles. It is 90 feet above the level of the sea. It was discovered in 1609 by Samuel Champlain, governor of Canada, whence its name. It is navigated by steamboats and other vessels, and is deep enough for ships of the largest class. Its waters are carried northward to the Saint Lawrence by the river Richelieu or Sorel, which, in conjunction with the Chambly Canal, affords navigation for large vessels, and forms a well-frequented line of communication. The south end of the lake is connected by a canal with the Hudson River, Lake Champlain thus affording water communication between the Saint Lawrence a few miles below Montreal and the Atlantic at New York. Upwards of 50 islands are scattered over its surface; and it receives numerous streams, none of which are very important. The scenery along its sides is picturesque. The Green Mountain Range lies about 20 miles east of the lake; on the west are the Adirondacks. It abounds in salmon, shad, pike and other fish; in winter it is usually frozen over. The chief port on its banks is Burlington, Vt. The other towns of importance are Rouses Point, Plattsburg, Port Henry, Crown Point and Whitehall in New York. During the wars between the United States and Great Britain, this body of water was the scene of numerous military operations.

The Champlain Society, whose headquarters are at Toronto, has published important historical writings dealing with the history of New France. In July 1909 a celebration was held in honor of the tercentenary of the discovery of Lake Champlain which was participated in by many nations.

CHAMPLAIN, Lake, Battle of, in the War of 1812. During 1812 and 1813 no important naval operations had taken place on Lake Champlain. On 3 June 1813 the British cleared the lake of the few small American vessels, and captured the commander, whereupon Lieut. Thomas MacDonough (q.v.) was ordered to construct a new navy. During the following winter and spring both Americans and British pushed forward the building of sloops, brigs and gunboats. The British were first afloat but the summer passed in manœuvres as Sir George Prevost with 11,000 men was preparing to cross the border. Brig.-Gen. Alexander Macomb (q.v.) with 1,500 regulars and 700 militia under Gen. Benjamin Mooers had encamped at Plattsburg at the mouth of the Saranac and had thrown up works on the southern side of the town just across the bridge over the Saranac, but as the village was untenable when the British approached from the north, Macomb destroyed the bridge and retired to his breastworks. From 6–11 Sept. 1814 the two armies continuously skirmished and the British brought up heavy ordnance preparatory to assaulting the fort, but when Prevost beheld MacDonough's fleet in the bay he decided before attacking to await the arrival of the British fleet under Capt. George Downie. On the morning of 11 Sept. 1814 the fleet appeared, consisting of the *Confiance, Linnet, Chubb* and *Finch,* besides 12 smaller gunboats. The American fleet consisted of the *Saratoga, Eagle, Ticonderoga* and *Preble,* besides 10 gunboats. While the weight of metal thrown by the American fleet surpassed that of the British, the latter had 60 long range guns to MacDonough's 45 and thus if the battle were fought at long range the advantage lay with Downie. But MacDonough anchored his fleet so that Downie would be compelled to pass between him and the land and could not come to anchor on his broadside out of range of the American carronades. Downie anchored his flagship, the *Confiance,* 300 yards from MacDonough's flagship, the *Saratoga,* and at the first broadside nearly blew the American vessel out of the water, killing or wounding one-fifth of the crew. While these two vessels were engaged, the *Eagle* disabled the *Chubb* but was herself soon driven out of the fight; the *Ticonderoga* drove the *Finch* to Crab Island where she surrendered; but the British galleys forced the *Preble* to seek shelter. This left the *Linnet* free to aid the *Confiance,* which, having suffered severely, lacked the power to silence the *Saratoga.* Thus exposed to the concentrated fire of both ships the starboard guns of the *Saratoga* were soon silenced but MacDonough let go his stern anchor, winded his ship and brought the unused port battery to bear on the *Confiance,* with the result that in 15 minutes Downie struck his colors. The *Saratoga* next opened on the *Linnet* and compelled her to surrender, whereupon the remaining British galleys, with the aid of their sweeps, moved away and escaped with every ensign down. The American loss was 52 killed and 58 wounded and the British loss 57 killed and 92 wounded. Meanwhile Prevost was shelling Macomb's defenses and endeavoring to cross the Saranac in the hope of crushing the Americans by assault. As these efforts were fruitless and as control of the lake was in American hands Prevost, during the night of 12–13 September, sent away his baggage and artillery and retreated, leaving behind only his sick and wounded. The Americans pursued a short distance but quickly returned. Consult Adams, Henry, 'United States' (Vol. VIII, pp. 91–113); 'American State Papers, Naval Affairs' (Vol. I, pp. 310–311); Barnes, James, 'Naval Actions of the War of 1812' (pp. 209–216); Brackenbridge, H. M., 'History of the Late War' (p. 274); Clark, G. R., 'Short History of the Navy' (pp. 189–198); Cooper, J. F., 'Naval History' (Vol. II); Emmons, George F., 'Statistical History of the Navy'; James, William, 'Naval Actions' and 'Military Occurrences' (Vol. II); Lossing, B. J., 'War of 1812' (pp. 858–875); MacDonough, Rodney, 'Life of MacDonough'; Maclay, E. S., 'History of the Navy' (Vol. II); Mahan, A. T., 'War of

1812' (Vol. II); Richard, G. H., 'Memoir of Alexander Macomb'; Roosevelt, 'Naval War of 1812' (pp. 376–397); Spears, J. R., 'History of the Navy' (Vol. III, pp. 132–185); Wiley and Rines, 'The United States' (Vol. V, pp. 434–440).

CHAMPLAIN STAGE, the name given by American geologists to the subsidence that was a feature of the close of the Glacial Epoch in New York, New England, Ontario and Quebec. At the beginning of the Glacial Epoch the elevation of this section of the continent may have been greater than now, but when the ice-sheet finally retreated the sea extended up the Saint Lawrence River nearly to Lake Ontario, and the lower Ottawa River and Lake Champlain were occupied by salt water. The stage is named from the lines of old sea beaches containing whale and walrus bones, thus showing the submergence, typically developed about Lake Champlain. The total amount of the depression varied, being greatest over the Saint Lawrence Valley. About New York harbor the coast was depressed fully 70 feet; at Albany 355 feet. Along the Maine shore the land was 150 to nearly 300 feet lower than now, and in the Saint Lawrence Valley the depression was over 500 feet, making allowance for the previous elevation the total depression in the Saint Lawrence Valley reached 1,500 feet. The climate of Champlain time was probably warmer and moister than that of the present. On the Pacific coast are evidences of depression in the region about Mount Saint Elias, shells of Champlain species being found at an altitude of 5,000 feet. (See GLACIAL PERIOD; QUATERNARY PERIOD). The term Champlainic system has been proposed to replace Ordovician system, but the proposal has not met with general acceptance.

CHAMPLEVE, shăn-lę-vā', **ENAMELS.** See ART ENAMELS.

CHAMPLIN, chămp'lĭn, **James Tift,** American educator: b. Colchester, Conn., 9 June 1811; d. Portland, Me., 15 March 1882. He was graduated as valedictorian at Brown University in 1834, and was tutor there 1835–38. He was a Baptist pastor at Portland, Me., 1838–41; professor of Greek and Latin, Waterville (now Colby) College 1841–58; president of the college 1857–73; professor of intellectual and moral philosophy 1858–73, when he removed to Portland to devote himself entirely to literary work. He published a large number of school and college textbooks, including English, Greek and Latin grammars, editions of Æschines' and Demosthenes' orations, Tacitus, and Butler's 'Analogy of Religion.' Others are 'Text-book of Intellectual Philosophy' (1860); 'First Principles of Ethics' (1862); 'Political Economy' (1868); 'Scripture Reading Lessons' (1876); 'Constitution of the United States; with Brief Comments on the Constitutions of England and France' (1880).

CHAMPLIN, John Denison, American author: b. Stonington, Conn., 29 Jan. 1834; d. 8 Jan. 1915. He was graduated at Yale in 1856, and admitted to the bar in 1859. In 1864 he became associate editor of the *Standard* at Bridgeport, Conn. He afterward published *The Sentinel* (1865–69) at Litchfield, Conn. He devoted himself entirely to literature from 1869, and became associate editor of the 'American Encyclopædia' (1875). Author 'Young Folks' Cyclopædia of Common Things' (1879); 'Young Folks' Catechism of Common Things' (1880, 1906); 'Young Folks' Cyclopædia of Poems and Places' (1880, 1899, 1911); 'Young Folks' Astronomy' (1881); 'Young Folks' History of War for the Union' (1881); 'The Chronicle of the Coach' (1886); 'Young Folks' Cyclopædia of Games and Sports' (with Arthur E. Bostwick, 1890); 'Young Folks' Cyclopædia of Literature and Art' (1901); 'Young Folks' Cyclopædia of Natural History' (1905); 'The Tragedy of Anne Hutchinson' (1911). Editor 'Fox's Mission to Russia' (1873); 'Cyclopædia of Painters and Paintings' (1886–88); 'Cyclopædia of Music and Musicians' (1888–90); 'Liber Scriptorum' (1893). Associate editor 'The American Cyclopædia' (1873–77); 'The Standard Dictionary' (1892–94); 'Orations, Addresses, and Speeches of Chauncey M. Depew' (1910).

CHAMPNEY, chămp'nĭ, **Benjamin,** American artist: b. Ipswich, N. H., 29 Nov. 1817; d. Woburn, Mass., 14 Dec. 1907. He went to Boston in 1834, and for three years worked in a lithographic establishment. From 1841 to 1848 he studied painting in Paris and Italy, exhibiting several times in the Paris Salon. He worked chiefly in landscape and flower painting, and his White Mountain paintings, which are owned in and around Boston, are famous. After 1853 he passed most of his summers in North Conway, N. H. He painted also a panorama of the Rhine and published 'Sixty Years' Memories of Art and Artists' (1900).

CHAMPNEY, Elizabeth Williams, American author: b. Springfield, Ohio, 6 Feb. 1850. She was graduated at Vassar College 1869, has traveled extensively in Europe and written many papers for *Harper's* and the *Century.* She is president of the board of managers of the Messiah Home for Children. She has published 'The Bubbling Teapot'; 'Howling Wolf and His Trick Pony'; 'All Around a Palette'; 'Bourbon Lilies'; 'Rosemary and Rue'; 'In the Sky Garden'; 'Vassar Girls Abroad'; 'Witch Winnie' series (7 vols.); 'Dames and Daughters of Colonial Days'; 'Romance of the Feudal Châteaux' (1900); 'Romance of the Renaissance Châteaux' (1901); 'Romance of the Bourbon Châteaux' (1903); 'Romance of the French Abbeys' (1905); 'Romance of Italian Villas' (1906); 'Romance of Roman Villas' (1908); 'Romance of Imperial Rome' (1910); 'Romance of Old Belgium' (1915).

CHAMPNEYS, chămp'nĭz, **Basil,** English architect: b. 1842. He was educated at Trinity College, Cambridge, and after studying architecture with the architect Prichard, of Llandaff, began the practice of his profession in 1867. Important works of his are the divinity and literary schools of Newnham College and the Archæological Museum at Cambridge; Indian Institute, Robinson Tower at New College and Mansfield College at Oxford; Rylands Library in Manchester; Butler Museum at Harrow; and Quincentenary buildings at Winchester College. He is cathedral architect at Manchester. He has published 'A Quiet Corner of England,' a delightful description of

Rye and Winchelsea (1875); 'Henry Merritt: Art Criticism and Romance' (1879); 'Coventry Patmore: Memoirs and Correspondence' (1900).

CHAMPOLLION, shäṅ pōl yôṅ, **Jean François,** LE JEUNE, French Egyptologist: b. Figeac, Lot, France, 23 Dec. 1790; d. Paris, 4 March 1832. At an early age he devoted himself to the study of Hebrew, Arabic, Coptic, etc. In 1807 he read a paper before the Academy of Grenoble on the ancient Egyptian geographical names, which he endeavored to explain by the Coptic. He then went to Paris, where he continued his Oriental studies, paying particular attention to the Coptic, and endeavoring through it to find the key to the Egyptian hieroglyphics. In 1809 he became professor of history at Grenoble, but soon retired from this post and went to Paris, where he devoted himself almost exclusively to the study of Egyptian antiquities. Assisted by the trilingual inscription of the Rosetta stone he at length discovered the key to the graphic system of the Egyptians, the three elements of which — figurative, ideographic and alphabetic — he expounded before the Institute in a series of memoirs in 1823. These were published in 1824 at the expense of the state, under the title of 'Précis du système hiéroglyphique des anciens Égyptiens.' In 1824 he went to Italy, and investigated the collections of papyri and other Egyptian antiquities in the principal cities there. In 1826 Charles X appointed him to superintend the new department of Egyptian antiquities in the museum of the Louvre. In 1828 M. Champollion went as director of a scientific expedition to Egypt, at the expense of the King. He was admitted a member of the Academy of Inscriptions in 1830. In 1831 the chair of Egyptian archæology was created for him in the Collège de France. His principal works are 'Grammaire Égyptienne' and 'Dictionnaire hiéroglyphique,' both published after his death. His 'Notice manuscrits' (1844 et seq.) gives an adequate description of the results of his Egyptian journey. Of the numerous books and essays published during his life the most noteworthy are 'Panthéon égyptien' (1824); 'Sur l'écriture hiératique' (1821); 'Sur l'écriture démotique' (1824). They are indispensable to the student of hieroglyphics. Consult Champollion, Aimé, 'Les deux Champollion, leur vie et leurs œuvres' (Grenoble 1888).

CHAMPOLLION FIGEAC, fē-zhäk, **Jean Jacques,** French archæologist, elder brother of the preceding: b. Figeac, Lot, 5 Oct. 1778; d. 9 May 1867. He completed his studies at Grenoble, published his first archæological memoirs in 1803, and was named successively librarian of Grenoble, professor of Greek literature, secretary and dean of the faculty of letters of the same town. He took an active part in everything connected with science and letters in the department of the Isère. He acted as secretary to Napoleon in drawing up under his instruction the account of his memorable passage from Elba to Grenoble. In 1828 a place was made for him as keeper of the manuscripts in the Royal Library, and shortly afterward he was installed in the chair of palæography in the École des Charts. He was made an officer of the Legion of Honor in 1866. His principal works are 'Antiquités de Grenoble' (1807); 'Paléographie universelle'; 'Nouveaux éclaircissements sur la ville de Cularo, aujourd'hui Grenoble' (1814); 'Annales des Lagides' (1819); 'Traité élémentaire d'archéologie' (1843); 'Écriture démotique égyptienne' (1843); 'L'Égypte ancienne et moderne' (1850); besides several other interesting works on Oriental history, and on the language and antiquities of the department of the Isère. He collaborated in editing the manuscripts left by his brother. Consult the authority cited above.

CHAMPS ELYSEES, shäṅz'ā'lē'zā' (Fr. (Fr. "Elysian Fields"), an avenue in Paris, with its surrounding gardens. It extends from the Place de la Concorde to the Arc de Triomphe de l'Etoile, a distance of one and a quarter miles, and is a famous public resort and promenade. The lower end forms a park, on either side of which are placed the Palais de l'Elysée and the two Palais des Beaux Arts, occupying the site of the old Palais de l'Industrie. It became the property of the Crown in 1616 and was ceded to the city in 1828.

CHANCA, chän'ka, **Dr.** (believed to have been DIEGO ALVAREZ CHANCA), Spanish physician: b. Seville; who became a companion of Columbus on his second voyage in 1493. One of the principal authorities for this voyage is the letter which he wrote to the Catholic college at Seville, giving an account of his journey. No record has been kept of his subsequent life.

CHANCE, in its original and strict meaning, is a description of events which cannot be subsumed under any law, causal or theological. Strictly speaking, it is an idea which few men would now be disposed to admit as corresponding to anything which really exists; the religious mind excluding it as inconsistent with the belief in the divine government, and the philosophical mind rejecting it as inconsistent with a recognition of universal laws of causation. As a word, however, it has always been, and always will be, popularly accepted as a term denoting an unknown cause, or a cause so remote that it is overlooked when events are considered superficially and apart from their universal connection. For the mathematical theory of events which are chance in this derived sense, see PROBABILITY, THEORY OF.

CHANCE, Games of. See GAMBLING.

CHANCE ACQUAINTANCE, A, a story by William Dean Howells, published in 1873. This agreeable and entertaining sketch contains many charming descriptions of the picturesque scenery and places about Quebec.

CHANCE-MEDLEY, homicide happening either in self-defense, on a sudden quarrel or in the commission of an unlawful act, without any deliberate intention of doing mischief.

CHANCEL, that portion of a church occupied by the clergy, and often separated from the nave and aisles by screens of carved stone or oak. The screen separating the chancel from the nave is called the rood screen, because anciently a rood or large crucifix was usually placed on it, accompanied with two figures representing Saint John and the Virgin Mary. In the chancel were situated the high altar, the sedilia, or seats for the officiating clergy, and the piscina, in which the water used for washing

the hands of the celebrant was poured. It usually contains carved seats or stalls, occupied by the clergy not engaged in the services. These are enriched with carvings and have canopies of carved oak. The chancel occupies the same place with the apsis in the ancient basilicas, and was called so from the *cancelli,* or rails used in the early churches to separate the clergy from the laity. The chancel is always at the east end of the church (churches being technically considered as having their major axes extending east and west) and is often constructionally a separate building opening from the nave with a lower roof elevation and raised several steps above the nave. In architecture the term is often employed as synonymous with choir (q.v.).

CHANCELLOR, Charles Williams, American physician: b. Spottsylvania County, Va., 19 Feb. 1833; d. Washington, D. C., 3 Jan. 1915. He studied at Georgetown College and the University of Virginia, 1848–52, and was graduated at Jefferson Medical College, Philadelphia, 1853. During the Civil War he was medical director of General Pickett's division in the Confederate army, 1863–65. He was professor of surgery in and dean of Washington University, Baltimore, 1868–75; secretary of the Maryland State board of health, 1875; president of the Maryland State Insane Asylum, 1880; and United States consul at Havre, France, 1893–97. Among his numerous reports and articles on medical and sanitary topics are the following: 'Report upon the Condition of the Prisons, Reformatories and Charitable Institutions of Maryland' (1875); 'Contagious and Infectious Diseases' (1878); 'Mineral Waters and Seaside Resorts' (1883); 'Drainage of the Marsh Lands of Maryland' (1884); 'Heredity' (1886); 'Sewerage of Cities' (1886); 'Climate of the Eastern Shore of Maryland.'

CHANCELLOR, Richard, English navigator: d. 10 Nov. 1556. He seems to have been brought up in the household of the father of Sir Philip Sidney and was chosen in 1553 as captain of the *Bonaventure* and pilot-general of Sir Hugh Willoughby's expedition in search of a northeast passage to India. The ships were parted in a storm off the Lofoden Islands and Chancellor, after waiting seven days at Vardöhus, the rendezvous agreed upon, proceeded alone into the White Sea and traveled thence overland to the court at Moscow, where he was very hospitably treated and was able to conclude a treaty giving freedom of trade to English ships. His interesting account of Russia was published in Hakluyt's 'Navigations.' Next spring Chancellor rejoined his ship and returned to England, where his hopeful reports led to the establishment soon after of the Muscovy Company. In the summer of 1555 he made a second voyage in the *Bonaventure* to the White Sea, and was at Moscow once more in the succeeding winter. In July 1556, he set sail on his voyage homeward, but was lost in the wreck of his ship in Aberdour Bay off the Aberdeenshire coast.

CHANCELLOR, an officer supposed to have been originally a notary or scribe, under the Roman emperors and named *cancellarius,* because he sat behind a lattice — called in Latin *cancelli* — to avoid being crowded by the people. There are, however, other derivations of this title. Whatever may have been its origin, the office and name of chancellor were undoubtedly known at the court of the Roman emperors, where the title seems to have signified originally a chief scribe or secretary, who was afterward invested with several judicial powers and with superintendence over the other officers of the empire. From the Roman empire the title and office passed to the Roman Catholic Church and hence every bishop has to this day his chancellor, the principal judge of his consistory. When the modern kingdoms of Europe were established upon the ruins of the empire, almost every state preserved its chancellor, with different jurisdictions and dignities according to their different constitutions. In all he seems to have had the supervision of all charters, letters and such other public instruments of the Crown as were authenticated in the most solemn manner, and therefore, when seals came into use, he had always the custody of the king's great seal. This officer has now great authority in all the countries of Europe.

The *Lord High Chancellor of Great Britain (originally of England)* is the first judicial officer of the Crown and exercises an extensive jurisdiction as head of the judiciary. He ranks as first lay person of the state after the blood-royal. He is always one of the commissioners appointed to represent the sovereign in opening and closing Parliament or giving the royal assent to bills. He is created by the delivery of the great seal into his custody. In like manner the act of taking away the seal formally terminates his office. He is a Cabinet Minister and a privy councillor in virtue of his office, is speaker of the House of Lords by prescription and in that office has the right to address their lordships as well as to vote. He vacates office with the ministry which appoints him. He has a salary of £10,000 and, no matter how brief his tenure of the office may be, is entitled to a pension of £5,000 a year on vacating it. When Sir Robert Finlay was in December 1916 nominated for the office in the Lloyd-George government, he is believed to have created a precedent in stipulating for waiving of the pension in his case. The Lord Chancellor presides over the Court of Appeal and the privy council in the exercise of judicial functions. He has the appointment of all justices of the peace in the kingdom, is visitor, in the king's right, of all royal foundations and patron of all Crown livings, the higher dignities in the Church of England being nominated by the Prime Minister. The office having in early times been always filled by ecclesiastics (for no others were then capable of an employment requiring so much writing), he became keeper of the king's conscience; and by special appointment he now exercises a general superintendence as guardian over all infants, idiots and lunatics, though these latter powers are not necessarily attendant on his office, as Blackstone seems to have imagined, but can be delegated by the Crown to any other judicial officer, as in fact they were delegated even as late as the reign of James I, when the seals were held by Dr. Williams, then dean of Westminster and afterward bishop of Lincoln. The great seal has been not infrequently put in commission and was last so on the resignation of Lord Thurlow in the year 1793. One

vice-chancellor was appointed to preside in the courts of equity by 53 George III, c. 24, and two by 5 Vict. c. 5, § 19. The two last-mentioned were at first subordinate vice-chancellors, but they were afterward all made of equal rank. They sat in separate courts, and an appeal lay from their decisions to the Lord Chancellor. They latterly sat in the chancery division of the Supreme Court of Judicature. See CHANCERY; SUPREME COURT OF JUDICATURE.

Chancellors of Ireland and Scotland.— There is a Lord High Chancellor of Ireland, who is the head of the judicial bench, with a salary of £8,000. He is not a member of the British ministry. The chancellorship of Scotland was abolished at the union. The Scottish Chancellor had no independent jurisdiction in equity, as there has never been a separate court of equity in Scotland; but he presided in Parliament, and was head of all the courts of judicature and of the Scottish office of chancery, in which all charters and other writs appointed to pass the great seal were recorded.

The *Chancellor of the Exchequer* is the Finance Minister of the Cabinet and as all questions of supply originate in the House of Commons, a peer is ineligible for this office, which originated in the separation of the chancery from the exchequer in the reign of Henry III. The holder of this office in recent years is generally held as having the reversion to the premiership, with which it has occasionally been conjoined.

The *Chancellor of the Duchy of Lancaster* is the representative of the Crown in the management of the lands of the duchy, which are the personal property of the sovereign. The office is a sinecure and is usually held by a minister of Cabinet rank, of high standing in the country, but who is unable to bear the physical strain incident to the management of a heavy department.

The *Chancellor of a University* is an official at the head of the university, generally a man of rank, whose duties are more or less nominal, but who is regarded as conferring the degrees. At Oxford his duties are almost entirely discharged by the vice-chancellor; the chancellor's own acts being limited to the signing of diplomas, etc. Under the vice-chancellor are four pro-vice-chancellors, nominated by him from among the heads of colleges, to one of whom, in his absence from the university, he delegates his authority. The chancellor of Cambridge University, whose duties are very similar to those of the Oxford official, is elected biennially by the senate; but there is no instance, at least in modern times, where a re-election has not taken place.

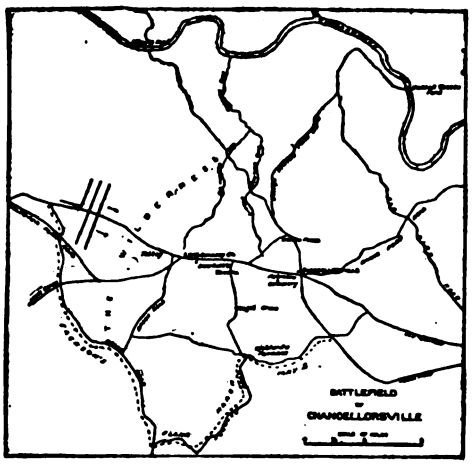
Chancellor of the Order of the Garter and Other Military Orders, an officer who seals the commissions and the mandates of the chapter and assembly of the knights of the order, keeps the register of their proceedings and delivers their acts under the seal of their order. The title "chancellor" is given, in England, to several officers of other bodies.

Chancellors of Other European Countries. — The Chancellor was one of the highest officers in the German states and by the influence of his office was one of the most important. In Germany this dignity was from the remotest times vested in one of the higher clergy, until the head of the German clergy, the archbishop and Elector of Mainz, united it forever with his office as arch-chancellor of the empire. The two other spiritual electors held the same dignity, but it was merely titular; the archbishop of Cologne, as arch-chancellor of Italy; the archbishop of Trèves, as arch-chancellor of Gaul and Arles, that is, the kingdom of Burgundy, once belonging to Germany. The arch-chancellorship of Mainz, on the contrary, had important duties attached to it — the direction of the Diet and of the public business, as well as of all Imperial chanceries. The Elector appointed a vice-chancellor, who was the actual minister of the empire at the Imperial court. In the new German empire the Chancellor (*Reichskanzler*) is the president of the Federal Council (*Bundesrath*), and has the general conduct of the imperial administration. All laws of the empire, after being sanctioned by the Emperor, must be countersigned when promulgated by the Chancellor.

The Chancellor of France held a position analogous to that in England, was the highest officer of state and the only one who, when once appointed, could not be dismissed. In case, therefore, it was desired to remove him from participation in affairs, a keeper of the seals (*garde des sceaux*) was appointed. As the Chancellor was properly the Minister of Justice, he was chosen from the body of jurists. A relic of his spiritual character was, that all his furniture, liveries and even his coach, were black.

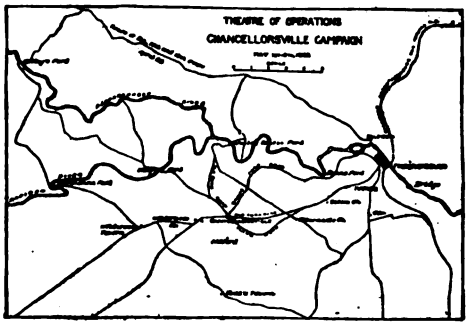
CHANCELLORSVILLE, The Battle of. The Chancellorsville campaign included the battle of Chancellorsville, 1–3 May 1863, the action at Marye's Heights, 3 May 1863, and the engagement at Salem Church, 3 and 4 May 1863. In the fore part of April 1863 the Army of the Potomac, under General Hooker, and the Army of Northern Virginia, General Lee, confronted each other on opposite sides of the Rappahannock at Fredericksburg. Lee was so strongly entrenched on the south side of the river from Port Royal on the right to Banks' Ford on the left, a distance of 25 miles, that an attack on his front was not to be thought of, and Hooker concluded to march his cavalry far beyond and around Lee's left, destroy his communications with Richmond and compel him to leave Fredericksburg, when he proposed to fall on his flank and rear as he fell back. For this purpose General Stoneman with 10,000 cavalry was put in motion, 13 April, under orders to ascend the Rappahannock, cross it west of the Orange and Alexandria Railroad, attack Lee's cavalry wherever found, and plant himself firmly across his line of retreat. Stoneman found the Rappahannock and other streams so swollen by heavy rains that he was compelled to abandon the movement, and Hooker modified his plans. He determined to flank Lee's position and compel him to come out and fight on open ground of Hooker's own choosing. Lee had, in and around Fredericksburg, exclusive of cavalry, about 60,000 men and 170 guns; the two divisions of McLaws and R. H. Anderson of Longstreet's corps, and Jackson, with the divisions of A. P. Hill and D. H. Hill, commanded by R. E. Rodes; Trimble, commanded by R. E. Colston and J. A. Early. Hooker had, not including his 12,000 cavalry, about 118,000 men

and 380 guns, divided into seven corps: First, Gen. J. F. Reynolds; Second, D. N. Couch; Third, D. E. Sickles; Fifth, George G. Meade; Sixth, John Sedgwick; Eleventh, O. O. Howard; Twelfth, H. W. Slocum. Both armies were in the best of condition. On the 27th the Eleventh and Twelfth corps marched for Kelly's Ford, 25 miles up the Rappahannock, arriving on the 28th, and being joined by the Fifth corps, all crossed the river next morning, the Eleventh and Twelfth corps marching for Germanna Ford on the Rapidan, the Fifth corps for Ely's Ford, lower down the same stream. Pleasanton's cavalry brigade accompanied the two columns. Some opposition was met at the fords, and at 2 P.M. of the 30th, after some sharp encounters with Stuart's cavalry, on the Germanna road, the three corps united at Chancellorsville, 11 miles west of Fredericksburg, and were joined the same day by two divisions of the Second corps, under Couch, which had crossed the Rappahannock at United States Ford, the Third corps also being near. The cavalry was thrown out on the roads toward Fredericksburg and Spottsylvania. Hooker had concentrated with great ability 71,000 men on Lee's left and joined them before night. Mahone's and Posey's brigades of Anderson's Confederate division had been guarding United States Ford; the passage at Germanna Ford turned this position, and the two brigades on the 29th fell back to Chancellorsville, where Anderson had come up with Wright's brigade. Next morning Anderson fell back with the three brigades to near Tabernacle Church, four miles, and began to throw up works covering the roads converging at that point. These movements on Lee's left were covered by demonstrations on his right and front below Fredericksburg. They began as early as the 21st, and on the 29th Sedgwick, with the First, Third and Sixth corps, moved to points two to four miles below town, threw pontoon bridges across the river and crossed troops to hold them. On the 30th he was ordered to demonstrate on Lee's right down the river, and the Third corps marched by the north bank of the river for Chancellorsville. Sedgwick's movements did not deceive Lee. On the afternoon of the 29th Stuart had informed him that heavy Union columns were marching for the Rapidan, and he ordered Anderson to march with Wright's brigade to Chancellorsville. When informed that Hooker had crossed the Rapidan he ordered McLaws, leaving Barksdale's brigade on Marye's Heights, to march with three brigades, at midnight of the 30th, and take position on Anderson's right. Jackson was ordered with three divisions to Chancellorsville, leaving Early's division with Barksdale's brigade — in all, about 8,500 men and 30 guns — to hold the lines at Fredericksburg against Sedgwick. McLaws arrived on Anderson's right about daylight, and was joined by two of Anderson's brigades from near Banks' Ford. Jackson marched at 3 o'clock on the morning of 1 May, and came up to Anderson at Tabernacle Church at 8, suspended work on the entrenchments and, at 11 o'clock, ordered McLaws and Anderson forward on the two roads leading to Chancellorsville, his own three divisions following Anderson. Three roads lead from Chancellorsville to Fredericksburg, the most direct, the old turnpike, passing Salem Church. The second, the plank road, led south from Chancellorsville, then east, uniting with the turnpike beyond Tabernacle Church. Both these roads were covered by Anderson's works. The third road led northeastward, passed Banks' Ford, about six miles distant, and continued to Fredericksburg. It was 11 o'clock, 1 May, when Meade pushed out two divisions on the Banks' Ford road and one, Sykes', on the turnpike, under orders to be at or near Banks' Ford at 2 P.M., and at the same hour, 11 A.M., Slocum advanced on the plank road, to be at Tabernacle Church at noon, Hooker's intention being to get out of the Wilderness, uncover Banks' Ford, and form for battle in open, elevated country, his right at Tabernacle Church, his left



covering Banks' Ford. Meade's left division had come in sight of Banks' Ford; Sykes, supported by Hancock's division, Second corps, had encountered McLaws and driven him back nearly to Anderson's works; Slocum, over two miles out, had met Jackson and was sharply skirmishing with him; and all was going well, when Hooker, impressed by the unexpected advance of the enemy, and fearing his own inability to get entirely out of the tangled forest, onto open ground, before being beaten in detail, ordered the columns back to Chancellorsville, thereby giving up the advantage of position practically gained and losing the confidence of his corps commanders. Jackson and McLaws followed the retiring troops and felt the lines with skirmishers, and McLaws got guns in position and cannonaded the left of the line. Hooker's line, as completed on the morning of the 2d, extended from the Rappahannock on the left to a point on the Germanna plank road full two and a half miles west of Chancellorsville. The Fifth corps and a division of the Second was on the left, facing east, the right in advance of the Chancellor House. The Twelfth corps was south of the plank road, its left less than one-fourth of a mile in front of the Chancellor House, its right near Hazel Grove, a little over a mile southwest of Chancellor's. Birney's division of the Third corps was on the right of the Twelfth, and the Eleventh corps continued the line from Dowdall's tavern westward beyond Talley's farm. The works held by the Twelfth, Third and Eleventh corps faced south, those of the

Twelfth in form of a bow, the plank road being the string of the bow; those of the Eleventh ran in a straight line generally just south of the road. For nearly the entire distance the line ran through an almost impenetrable forest of scrub-oak and pine. There was a spacious clearing around the Chancellor House, where Hooker had his headquarters, and open ground around Dowdall's. A division of the Second corps and two of the Third were in reserve. Pleasanton's cavalry was near Chancellor's House. On the evening of 1 May Lee had a conference with Jackson. To attack Hooker's 71,000 men, behind works, with 48,000, was certain to entail a terrible loss of life, and it was determined that Jackson, with nearly 30,000 men, infantry, cavalry and artillery, should march across Hooker's front and assail his right flank and rear, Lee remaining with McLaws' and



Anderson's 18,000 men to watch his left, demonstrate on it, and guard the roads to Fredericksburg. Jackson moved on the morning of the 2d with his accustomed celerity, and about 4:30 P.M. his head of column was on Hooker's right and rear, and he began to form line a scant mile from the right flank of the Eleventh corps. His movement had been discovered and misunderstood. As early as 9 o'clock he was seen marching a mile or so to the south; information of the fact was sent to Slocum and Howard, and the instructions to both to strengthen their flanks. Hooker soon came to the conclusion that Lee was retreating, and about 1 P.M. Sickles, at his own request, was ordered to take two divisions of the Third corps, move out and attack, which he did, falling on Jackson's rear at Welford's Furnace, taking some prisoners. Barlow's brigade of the Eleventh corps was sent to Sickles and Pleasanton's cavalry joined him, but the forest was too dense for cavalry operations, and Pleasanton withdrew two of his regiments and battery to Hazel Grove, where Sickles had left some of his artillery. Williams' division of the Twelfth corps was sent from its works to form on Sickles' left, attack Anderson's left and roll him back on Chancellorsville. Williams was about to attack when Jackson fell on the flank of the Eleventh corps and went back to his works. The Eleventh corps was badly posted and, though repeatedly informed by brigade and regimental commanders and picket officers of the gathering enemy on the flank, the superior officers, with one exception, lulled into security by the pleasing reports that Jackson was retreating, made no adequate provision against a flank attack, and most of the men were preparing supper when the storm broke. Jackson had formed his 26,000 infantry in three lines across the plank road, a mile on either side of it, artillery in the road, and a little after 5 o'clock gave the order to advance. The lines advanced with a rush, startling the game in the forest. The Union skirmishers were quickly driven in, and with a wild yell the main Confederate line struck the right brigade of Devens' division, flanked it, and after two or three rounds had been fired it gave way, the enemy following, striking and flanking everything in the way. No troops in the world, so placed, could stay such an attack. Some regiments made heroic stand and fought brilliantly, but in 30 minutes Devens' division of 4,000 men was routed and the Confederates advanced upon Schurz's division, which had changed front. Schurz held ground about 20 minutes, and then fell back upon Buschbeck's brigade, east of Dowdall's. Here Schurz rallied some of his men. Buschbeck stood three-quarters of an hour, and it was after 7 o'clock, when, attacked in front and flank, he fell back in good order to Fairview, where 40 guns of the Eleventh and Twelfth corps were being massed on high ground in his rear. Howard's corps had been driven two miles in less than two hours, losing nearly 1,500 killed and wounded and 1,000 prisoners. The force of Jackson's attack had spent itself; his two leading divisions — Rodes' and Colston's — had become inextricably mixed; the men were tired and hungry, and Jackson suspended their further advance and ordered A. P. Hill to relieve them. Meanwhile Hooker had sent Berry's division of the Third corps and Hays' brigade of the Second to the west edge of the open field north of the road; on Berry's right were some of Schurz's regiments; and Williams, desisting from his attack on Anderson, regained part of his works and formed south of the road on Berry's left, Buschbeck in his rear. This covered the road at a distance of a little over a half mile west of Chancellor's House. Sickles, when informed of Howard's disaster, fell back from Welford Furnace to Hazel Grove and formed on Pleasanton's left. Barlow drew up in Pleasanton's rear, all close to Williams' left and front. The two Confederate lines fell back to the open ground around Dowdall's, to re-form, and A. P. Hill was brought up and his leading brigade pushed along the plank road beyond the intersection of a road leading left to White House, and United States Ford, the road to be taken by Hill to cut off Hooker's retreat. While Jackson was reconnoitering on this road, beyond his main line, skirmishing began between the opposing pickets in the woods, and as Jackson, with his staff and orderlies, was riding back, the mounted body was mistaken for Union cavalry and fired into, Jackson (about 9:20 P.M.) was wounded in three places, both arms being shattered. Nearly the entire escort were also killed or wounded. Jackson died 10 May. At the sound of the firing in the woods the Union guns on Fairview opened a furious fire down the plank road, causing some confusion to the Confederate column on it. During this fire A. P. Hill, next in command, was wounded; the intended advance was suspended, and Gen. J. E. B. Stuart was sent for to take command. During the night and early morning some changes were made in the Union line by which the approaches on the right to the United States

Ford were covered by Reynolds' corps and part of Meade's, and the Eleventh corps took position on the extreme left vacated by Meade. At 9 P.M. Hooker, not knowing that Sedgwick's entire corps was at Fredericksburg, ordered him to cross from Falmouth and march up the south side of the river to Chancellorsville and attack Lee's rear at daylight, 3 May, while he attacked in front. Pleasanton and Sickles were ordered to fall back from Hazel Grove at dawn. Pleasanton marched back at 4 o'clock, and Sickles was following when his rear was caught by the oncoming Confederate line. Stuart, who had assumed command of Jackson's corps, advanced at 5 o'clock, 3 May, with great impetuosity, his right attacking Sickles as his rear brigade was about retiring from Hazel Grove. The brigade was soon driven, four guns were captured and Stuart swept on. Thirty Confederate guns were put in position at Hazel Grove which swept the open ground of Fairview and poured an enfilading fire on the right of Geary's division of the Twelfth corps, which was fighting Anderson, and at the same time Geary's left was being pounded by McLaws' guns. The battle now became fierce along the entire line of the Second, Third and Twelfth corps. On the right Stuart's men fought French's division of the Second corps and the three divisions of the Third taking the Union works, being driven from them and retaking them. Williams was fighting Stuart's right, Geary of the Twelfth corps was desperately engaging Anderson, and on his left, covering Fredericksburg road, Hancock's division of the Second corps was resisting the fierce attacks of McLaws. Stuart gradually gained ground and united his right with Anderson's left near Hazel Grove. The Union ammunition began to fail, and finally, about 9 o'clock, French, of the Second corps, the Third corps and Williams' division of the Twelfth, after frightful losses, began to fall back, and the Confederates gained the west of the Chancellor plateau and swept it with artillery. A cannon-shot struck a pillar of the Chancellor House against which Hooker was leaning. He was knocked down and stunned, and Couch, who was second in command, was instructed by Hooker to withdraw to a position, already selected, about three-fourths of a mile north of the Chancellor House, and covering United States Ford. The right and centre, closely pressed, fought their way back; Geary, attacked in front, right flank and rear, followed; Hancock followed Geary; before noon the troops were in the new position, and here the battle of Chancellorsville proper ended, for, before Lee had completed preparations to renew his attack, he heard of the capture of Fredericksburg and Marye's Heights and the advance of Sedgwick. Suspending further operations against Hooker, he turned his attention to Sedgwick, sending McLaws' division to oppose him.

When Sedgwick received Hooker's order of 9 P.M., 2 May, to cross the river at Fredericksburg, he had already done so and was three miles below the town. It was 11 P.M. when he received the order; he had 14 miles to march before he could reach Chancellorsville, and an enemy barred the way. He had about 23,000 men. His three divisions were commanded by Gens. John Newton, W. T. H. Brooks and A. P. Howe. Brooks was left below Fredericksburg, and Newton led the advance on the town. The night was dark; progress was slow; frequent halts being made while the skirmishers were feeling the way; it was the gray of the morning when Newton reached the rear and left of Fredericksburg; and as daylight came Marye's Heights were seen to be held by the enemy. Gibbon crossed the river from Falmouth and reported to Sedgwick with his division, and under cover of a demonstration by Newton, advanced on the right to turn the position, but was stopped by the canal and a concentrated fire of artillery. He found also that Hays' brigade of Early's division and Wilcox's of Anderson's were in his front, and he was obliged to fall back. On the other flank Howe's division failed to make an impression. Nothing remained but to assault the heights and storming columns were formed, Howe forming three on the left and Newton two of two regiments each, strongly supported. These were launched against the Confederate position and were bloodily repulsed by Barksdale's brigade. The assault was renewed and Marye's Heights carried about 11 o'clock, with a loss to Sedgwick of nearly 1,000 killed, wounded and missing in a very few minutes. He took 15 guns and nearly 1,000 prisoners. Here a delay occurred to get Brooks' division up, which was to take the advance, and it was 3 o'clock before Sedgwick marched for Chancellorsville, leaving Gibbon to hold the town and cover the bridges there. His march was impeded by Wilcox, who had regained the road in his front and made a stand half a mile in advance of Salem Church, where McLaws had now come up and formed across the road. Brooks' division advanced and Wilcox fell back to the church, Brooks closely following, and a desperate encounter raged around the church, in which at first Brooks, supported by Newton, was successful, but was finally compelled to fall back after losing 1,500 men. Dispositions were made to renew the struggle, but night came and both sides slept on their arms. Early, who had concentrated his command at Cox's, on the telegraph road, south of Fredericksburg, had Lee's permission to attack Marye's Heights and Sedgwick's rear at daylight. He was joined by Barksdale and, as Marye's Heights were held by a small Union force, his attack succeeded. Leaving Barksdale to hold the heights and prevent an advance of Gibbon, who was in the town, Early moved toward Salem Church and asked McLaws to co-operate with him. Meanwhile Lee, retaining only Jackson's three depleted divisions to confront Hooker at Chancellorsville, led Anderson to unite with McLaws and Early, and drive Sedgwick across the Rappahannock, the three divisions aggregating about 21,000 men. Anderson arrived about noon of the 4th and took position between McLaws and Early. Sedgwick was now hemmed in on three sides, his line in shape of a horseshoe, both flanks on the river covering Banks' Ford. The line was five or six miles in length, Newton, on the right, facing McLaws on the west; Brooks, in the centre, facing south, confronting Anderson, and Howe, on the left, facing east, opposing Early. Skirmishing was kept up during the day, and at 6 o'clock, Lee, after reconnoitering the position, ordered an attack to break the centre. Newton was not seriously attacked but Howe and Brooks were assailed with great

spirit, Early, falling upon the former and endeavoring to turn his left, in which he did not succeed, two of his brigades being repulsed and thrown into confusion by Howe's artillery. An attack on Howe's right and Brooks' left was also repulsed. The Confederates continued the contest until darkness put an end to it. Sedgwick then withdrew from the field to Banks' Ford, where he was covered by 34 guns on the north side of the river, but he had lost so heavily and was hemmed in so closely that, with Hooker's approval, he crossed the river during the night, taking with him nine captured guns and about 1,400 prisoners. His loss, since crossing the river on the 2d, had been 3,200 killed and wounded and 1,500 captured. During the night Gibbon recrossed the river to Falmouth, and on the morning of the 5th Lee was again in full possession of the south side of the river below Chancellorsville. Early was left to hold Fredericksburg, and Lee marched back with McLaws and Anderson to renew the battle with Hooker. A heavy storm came up, converting dry ravines into torrents and the soil to deep mire, and the attack was deferred until next morning. When day came Hooker had recrossed the river at United States Ford, and the Army of the Potomac marched to its old camp, and Lee returned to his old position at Fredericksburg. The Union loss at Chancellorsville was 1,082 killed, 6,849 wounded and 4,214 missing. Including the losses at Fredericksburg, Marye's Heights and Salem Church, the Union loss in the entire campaign, 27 April to 5 May, was 1,606 killed, 9,762 wounded and 5,919 missing; an aggregate of 17,287. The Confederate loss during the campaign was 1,665 killed, 9,081 wounded and 2,018 captured; an aggregate of 12,764. Consult 'Official Records' (Vol. XXV); Hotchkiss and Allan, 'Chancellorsville'; Doubleday, Abner, 'Chancellorsville and Gettysburg'; Bates, S. P., 'The Battle of Chancellorsville'; Dodge, T. A., 'The Campaign of Chancellorsville'; Hamlin, A. C., 'The Battle of Chancellorsville'; The Century Company's 'Battles and Leaders of the Civil War' (Vol. III).

E. A. CARMAN.

CHANCERY, formerly the highest court of justice in England, now consolidated with the other superior courts in the Supreme Court of Judicature.

The Court of Chancery obtained its name from being under the jurisdiction of the Lord Chancellor and its purpose was never more succinctly expressed than in Cowel and Jacob's Law Dictionary: "All the other justices in the Kingdom are tied to the law, but the Chancellor hath the King's absolute power to moderate the written law, govern his judgment by the law of nature and conscience, and ordering all things *juxta æquum et bonum.* . . . He is not limited by the written law, but by conscience and equity, according to the circumstances of the matter." And in the words of King James I, "When the rigour of the law in many cases will undo a man, then the Chancery tempers the law with equity, and so mixes mercy with justice, as it preserves a man from destruction." The jurisdiction of the court was therefore wide; and between it and the common lawyers a long struggle ensued. Its jurisdiction was inoperative in ordinary common law cases, or in civil cases in which the common law courts could render adequate justice. The great objection of the common law practitioners was that the very extensive powers of the chancellor's court were exercised, not according to fixed rules of law, but at the discretion of the chancellor. In course of time, however, under a succession of able chancellors, the body of law administered by it became quite as fixed as the common law. Thus there came into existence the curious anomaly of two co-ordinate sets of tribunals adjudicating on the same matters on conflicting principles. It was thus quite possible for a suitor to win in the Court of Chancery who had not the smallest chance of prevailing in the common law courts. In the caustic words of Lord Chancellor Westbury, one tribunal was set up to do injustice and another to stop it. The distinctive functions of the Court of Chancery remained until the passing of the Judicature Acts of 1873 and 1875. (See below). The Court of Chancery embraced six superior courts called high courts of chancery and numerous inferior courts. The superior courts were the Court of the Lord High Chancellor, the Court of the Master of the Rolls; the Court of Appeal in Chancery, constituted by the Lord Chancellor sitting alone with either of the two lords justices in appeal or by the two lords justices sitting together apart from the Lord Chancellor; and the courts of the three vice-chancellors. The ordinary legal jurisdiction of chancery embraced the issuing of writs for a new Parliament; of pleas of *scire facias* to repeal letters patent, and of all original writs. There was also a jurisdiction acquired by statute or special delegation in issuing writs of habeas corpus and inquiring into charitable uses. There were numerous other powers conferred by act of Parliament, and the Lord Chancellor, together with the lords justices of appeal, had exclusive authority over the persons and property of idiots and lunatics. Appeals in bankruptcy were heard by the Court of Appeal in Chancery. The sittings and business of this court of appeal were regulated by the Lord Chancellor.

The procedure of the Court of Chancery at one time, by reason of its traditions and forms (commonly known as "red tape") became so cumbersome as partially to defeat its own ostensible aims and rendered reform imperative. Charles Dickens made a determined attack upon the delays of chancery practice in his 'Bleak House,' and subsequent changes have been commonly attributed to his influence.

The English Court of Chancery is now a division of the High Court of Justice, which is itself one of the two departments of the Supreme Court of Judicature in which are united all the higher courts of justice in England, exclusive of the appellate jurisdiction of the House of Lords and the privy council. The present judges of chancery as a division of the High Court of Justice are the Lord Chancellor, who presides over the division, and six justices. According to the provisions of the act by which the Supreme Court of Judicature was established, the distribution of business, both as to its commencement and its transfer, was made subject to rules of court and orders of transfer. By the operation of these provisions chancery, like the other divisions of the court to which

it now belongs, was gradually to cease to be a separate department; but in the meanwhile, subject to these rules and orders, certain causes and matters were assigned to chancery until these provisions should take their full effect. These are enumerated in the Supreme Court of Judicature Act (36 & 37 Vict. c. 66, § 34), and are (1) all causes and matters pending in the High Court of Chancery at the commencement of the act (finally fixed for 1 Nov. 1875); (2) all causes and matters to be commenced after the commencement of the act under any act of Parliament by which exclusive jurisdiction in respect to such causes or matters has been given to the Court of Chancery, or to any judges or judge thereof, except appeals from County Courts; (3) administration of the estates of deceased persons; partnerships; mortgages; raising of portions or other charges on land; sale and distribution of the proceeds of property subject to any lien or charge; trusts, charitable or private; rectification or setting aside or cancellation of deeds or other written instruments; performance of contracts between vendors and purchasers of real estates, including contracts for leases; partition and sale of real estate; wardship of infants and the care of infants' estates. Chancery, as a division of the High Court of Justice, has no exclusive right to the administration of equity, the act already mentioned making provision under certain rules for the concurrent administration of law and equity in all the divisions of the Supreme Court of Judicature. The Court of Appeal in Chancery no longer exists and its functions are transferred to the Court of Appeal, which in the new Supreme Court of Judicature is the complementary department of the High Court of Justice. The affairs of lunatics are still under the supervision of the Lord Chancellor. See also EQUITY.

In the United States the general tendency has been likewise to abolish courts of chancery as separate departments, and equity jurisdiction is generally conferred on the courts of law. Delaware, New Jersey and Tennessee are among the few States that still retain the former practice.

In the Catholic Church the chancery denotes (1) the office in a diocese whence come those documents necessary for the exercise of episcopal power; (2) the office in Rome which drafts and expedites the bills or briefs by which the mind of the Pope is made known to Christendom or to particular suitors.

CHANCRE. See SYPHILIS.

CHANCROID, a contagious venereal disease characterized by the presence of one or more, often several, suppurative ulcers, chiefly located in the genital regions. These are due to infection by the organisms of dirt and are not true syphilitic lesions. Very frequently both hard and soft chancres are communicated at the same time, but they can be distinguished. Chancroid is definitely a dirt disease and is due to uncleanliness as well, perhaps, as to a specific micro-organism, the streptobacillus of Ducrey. Chancroid usually develops within 24 to 48 hours after infection as a minute macule or pin-point vesico-pustule surrounded by a reddish halo. This increases day by day until a pustule or ulcer about the size of a small coin is developed. This ulcer is usually a soft ulcer. There is not much induration in the connective tissue beneath it, which is one of the distinguishing features between it and true syphilitic chancre. Chancroids are usually multiple, whereas chancres are usually single. They persist usually from three to six weeks and are often very difficult to cure, and furthermore a patient with chancroid may reinfect himself and thus spread the lesion at times very widely.

CHANDA, chŭn'dä or chän'dä, India, chief town of the district of Chanda in the Nagpur division of the Central Provinces and 90 miles south of the town of Nagpur. It is surrounded by a stone wall five and a half miles in circuit, from 15 to 20 feet high, 10 feet thick and flanked with rough towers large enough for the heaviest guns; inside which are cultivated fields and detached villages, while there are also suburban quarters outside. There is a citadel now enclosing the jail, tomb of the Gond kings, three interesting temples, massive monoliths, etc. Outside the walls is a large water tank constructed under Gond rule and a collection of ancient statuary known as Rayapā's idols, the largest of which is 26x18x3 feet. The town has a public park, civil station and military cantonments. Chanda is the commercial centre of the district with manufactures of silk, cotton, dyestuffs, slippers, bamboo work and gold and silver work. It has numerous schools and a mission station. The district contains considerable iron and coal deposits. Pop. (1911) 19,866; the district has an area of 10,156 square miles and a population of 677,544.

CHANDELEUR, shän-dė-lėr, ISLANDS, a group of about 15 small islands in the Gulf of Mexico about 25 miles off the east coast of Louisiana, from which they are separated by Chandeleur Sound. There is a lighthouse on the northern end of the northernmost island which is in lat. 30° 2′ N. and long. 88° 52′ W.

CHANDELIER. An apparatus suspended from the ceiling or vault and supporting two or more lighting units. Usually, in modern

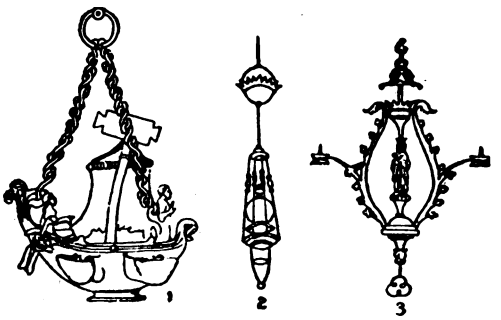


FIG. 1.—(1) Roman Christian Lucerna pensilis for four wicks (from the Catacombs). (2) Corona style Chandelier (from an old MS.). (3) German church Chandelier of the Middle Ages.

times, the lights are supported on arms or branches radiating from a central shaft. The chandelier may be said to have originated in the ancient suspended oil lamp (*lychnus*) of several wicks (*polymixos*) used by the Romans. (See Fig. 1). By the 4th century A.D. the Catholic Church began to use *coronæ, phari,*

pharicanthari, circuli luminum, polycandelæ, etc., carrying a multitude of candles (Pope Adrian presented Saint Peter's, Rome, with one carrying 1,370 candles in the 8th century). These were all terms for the *corona lucis* (see CORONA), or crown light. Great and beautiful examples of these elaborate crown lights are still in existence in the "heavenly Jerusalem" design, with their small towers or "tabernacles" or "gates" for the Apostles. That presented by Frederick Barbarossa to the minster at Aix-la-Chapelle is 13 feet in diameter. (See Fig. 2). Another is in the Hildesheim Cathedral (circa 1050), 20 feet in diameter with 72 candle holders. Most of the elaborate crown lights were constructed in the 11th and 12th centuries, and while many carried candles, others were for oil lamps. Their construction was, for the most part, of metal (copper, iron, silver, even gold) and ornamented with enamels, etc.; some were of wood. In the 13th century elaborate forged ironwork was in great vogue, therefore chandeliers were fashioned in this manner. In the 14th century chandeliers began to take on a star or radiation form with six to eight branches supporting a number of candles or lamps. These were mostly of bronze. In this period a species of trophy device in chandeliers took form in Germany, made up of the horns of the animals of the chase (stag, elk, elephant, etc.). This fashion remained popular till the 18th century. In the 15th century wooden crosses acted as chandeliers frequently. Oak was much favored, and, while many were quite plain, others, for church use, had elaborately carved centrepieces from which radiated handsomely decorated curved arms of forged iron supporting candle sockets; others were entirely of bronze or copper, a few of silver. The plain crown light still persisted. The 16th century retained much of the radiate style of the preceding century but rock-crystal decoration (which had been practised in a modest way since the 13th century) appears (from documentary evidence) to have become more general. Flanders produced lovely chandeliers at this time which are yet much admired. To this century belongs the famous historic "Galileo" chandelier in the cathedral of Piza, a magnificent work of bronze of the Italian Renaissance, whose swinging is said to have led to the pendulum in horology. In the 17th century a few wooden chandeliers were still produced, but with artistic carved decoration — most of them were constructed for temporary (festivals, etc.) use. Under Louis XIII Dutch copper chandeliers became popular. This style had a central shaft composed of a number of balls relieved by balustre forms. A common device was to have the chandelier surmounted by a royal crown, ducal or other coronet. Very elaborate chandeliers were produced in this century in wrought iron, bronze and copper (Flanders was doing very fine work in copper castings). Silver was used to some extent, also rock crystal was becoming quite the vogue; but the former was alone used by royalty, nobility and the Church. The crystal ornament was becoming a part in the establishments of the wealthy. In the 18th century the thorough combustion (sootless) of oil was becoming effective (Argand, Lange, Quinquet inventions), and we have suspended lamps largely replacing candles in chandeliers. Under Louis XV and Louis XVI were constructed for lay use more chandeliers of great importance than ever before, the Church having had the very large and elaborate pieces. The furnishing of civic homes with luxurious decoration was a new growth, and, by the second half of the 18th century, practically all chandeliers had crystal ornament. Every chandelier by this time had arms or branches; the "console" or reclining Ω was the form prevalent. A common style of crystal decoration consisted of interlacing strings of facetted crystal beads — often so elaborate as to be cumbersome. Ordinary glass sufficed usually, but rock crystal was favored by the wealthy. The chandelier, in some form, was now common property among

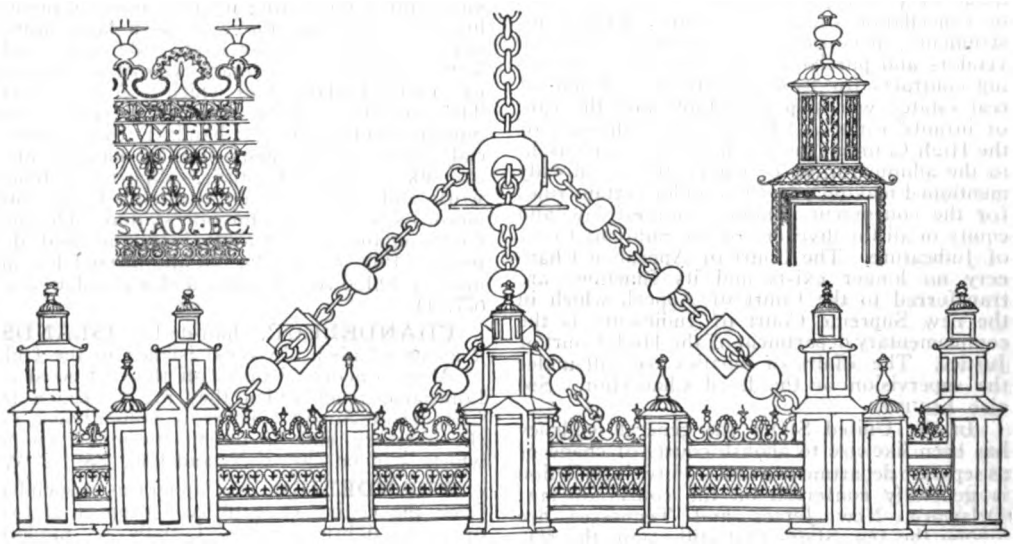


FIG. 2.—The great 13th century Corona Chandelier at Aix-la-Chapelle Minster. Details: Left, section of railing; right, style of Tower decoration.

all classes of city dwellers, except the very poorest. In chandeliers de luxe we find porcelain (Dresden and Sèvres) flowers figuring as ornament, and soon the usage of these fictile

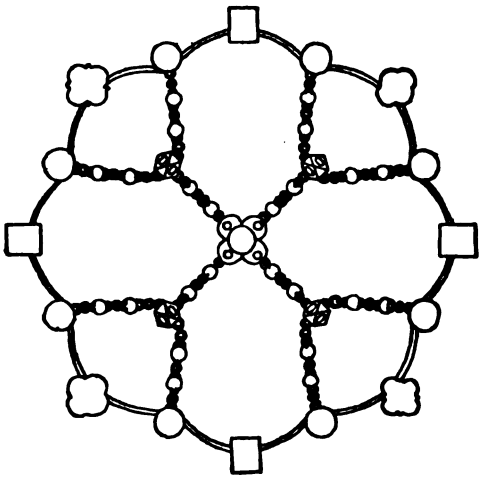


FIG. 3.— Horizontal plan (birds'-eye view) of Aix-la-Chapelle Corona Chandelier.

flowers became so common that porcelain flower-making became a distinct Paris industry. Some chandeliers of the Louis XVI period

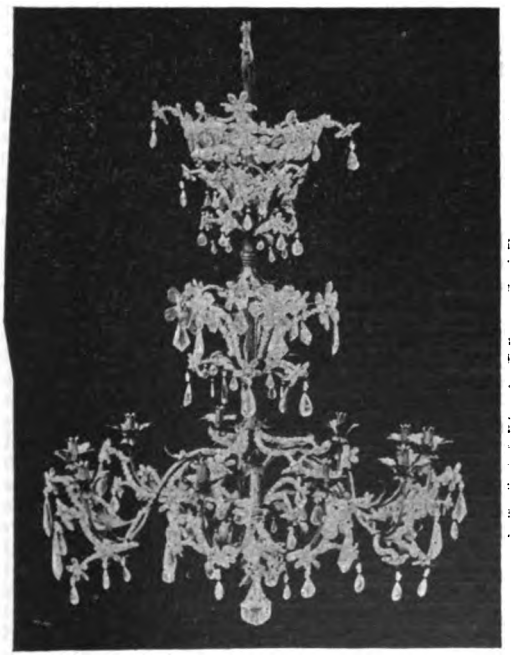


FIG. 4.— Italian 18th Century Crystal (lustre) Chandelier. In Metropolitan Museum of Art, New York.

had their facetted beads made of strass, some of polished steel.

During the early years of the 19th century but one style prevailed in the construction of chandeliers, bronze-gilt frames so swarming with crystal decoration as to make the chandelier body a mere accessory hidden in garlands of crystal beads. Immense, gorgeous constructions were made for use in the theatres, etc., the most noted being that of the Grand Opera House, Paris, by Garnier. With the introduction of hydrogen gas for lighting purpose no great transformations occurred in the forms used for chandelier (often termed *gasolier*) construction, pipes taking the place of bar metal and gas nipples displacing the old candle pricket or the later sockets. But, with the comparatively recent invention of illumination by electricity, a wider field has been given for the designer to work in. In America very artistic forms have evolved in the *electrolier*, some reverting to the classic Greco-Roman *lychnus*, others showing modern originality.

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CLEMENT W. COUMBE.

CHANDERNAGORE, chŭn-dẽr-nŭ'gōr or chăn-dẽr-nạ'gōr, or **CHANDARNAGAR,** India, town on the right bank of the Hugli, 16 miles north-northwest of Calcutta. Its only manufacture is cotton cloth, and there is no trade but with Calcutta. The French established a factory there in 1676, and in 1688 obtained a formal cession of it, together with its territory of about three and a half square miles, from Aurungzebe. It was three times taken by the British, first in 1757, but finally restored to the French in 1816. Chandernagore is under a sub-governor, subordinate to the governor of Pondicherry. Pop. of town and territory 26,000, including a small military detachment and a few Europeans and Eurasians, the great bulk being natives.

CHANDLER, Abiel, American merchant: b. Concord, N. H., 1778; d. Walpole, N. H., 22 March 1851. He was graduated at Harvard College in 1806, and was for many years a merchant in Boston. He died a widower, without children, and devised $50,000 to Dartmouth College. The Chandler School of Science at Dartmouth was established in 1851 in pursuance of this bequest. For many years it was maintained as a separate department, but has recently been formally incorporated into the college and it is now known as the Chandler scientific course leading to the degree of bachelor of science.

CHANDLER, Charles Frederick. American chemist: b. Lancaster, Mass., 6 Dec. 1836. He studied at the Lawrence Scientific School of Harvard College and at the universities of Ber-

lin and Göttingen, receiving his doctor's degree at the latter in 1856. He was professor of chemistry in Union College, 1857–64, and professor of analytical and applied chemistry in the Columbia College School of Mines, 1864–1903. In 1858 he was elected to the chair of chemistry in the New York College of Pharmacy, and in 1876 to the chair of chemistry and medical jurisprudence in the College of Physicians and Surgeons. He became chemist to the metropolitan board of health in 1865, and its president in 1873, being instrumental in securing great reforms in connection with the sanitary condition of the markets and the purity of the food supply, notably in the case of milk. He is a member of the chemical societies of Berlin, London and Paris, and of the National Academy of Sciences. With his brother, Prof. W. H. Chandler, he founded the *American Chemist*, a monthly journal devoted to chemical science. To this and to the annual reports of the New York health department he has contributed many papers on chemistry, water-supply of cities, purification of coal gas, on petroleum, milk, sorghum and glucose. Among the numerous reforms introduced during the administration of Professor Chandler were the segregation of slaughter-houses and the passage of the Tenement-House Act, providing that the plans of every tenement-house must first be submitted to the Board of Health.

CHANDLER, Francis Ward, American architect: b. Boston, 30 Sept. 1844. He was graduated at the Lancaster Academy in 1861, served in the 53d Massachusetts Volunteers in 1861–63. He studied architecture and worked with Ware and Van Brunt, Boston, in 1864–67. He spent 1867–69 in Paris and in 1869–70 was assistant in the architectural department of the Massachusetts Institute of Technology. In 1871–74 he was assistant architect in the Treasury Department, Washington. From 1874 to 1888 he was a partner of E. C. Cabot, Boston, and in 1888 became professor of architecture in the Massachusetts Institute of Technology, becoming professor emeritus in 1911. He has published 'Construction Details' (1892); 'Notes on Limes, Cements, Mortars and Concretes' (1892); and edited 'Municipal Architecture in Boston' (1898) and many articles in the *Technology Quarterly*.

CHANDLER, Frank Wadleigh, American writer: b. Brooklyn, N. Y., 16 June 1873. He was graduated at the Polytechic Institute of Brooklyn, 1894; studied literature and philosophy at Columbia University, and at Oxford, London and Paris, 1895–99. In 1899 he was appointed professor of literature and history in the Polytechnic Institute, and in 1901 lecturer in comparative literature at Columbia. In 1910 he became professor of English and comparative literature in the University of Cincinnati, and in 1913 he became dean of the College of Liberal Arts of the same university. He has written 'Romances of Roguery, an Episode in the History of the Novel' (1899); 'Some Theories of the Novel's Evolution in East and West' (1900); 'The Literature of Roguery' (1907); 'Aspects of Modern Drama' (1914).

CHANDLER, Richard, English archæologist: b. Elson, Hampshire, 1738; d. Tilehurst, Berkshire, 9 Feb. 1810. He was educated at Winchester and at Queen's and Magdalen colleges, Oxford. His first important work was 'Marmora Oxoniensia' (1763), an elaborate description of the Oxford marbles. He afterward traveled through Greece and Asia Minor, with Revett, architect, and Pars, a painter, at the expense of the Dilettanti Society, to examine and describe the antiquities. The materials collected were given to the world in the following publications: 'Ionian Antiquities' (1769); 'Ancient Inscriptions' (1774); 'Travels in Asia Minor' (1775); and 'Travels in Greece' (1776). He was an Anglican clergyman and at his death was rector of Tilehurst, near Reading.

CHANDLER, Seth C., American astronomer: b. Boston, Mass., 16 Sept. 1845; d. there, 31 Dec. 1913. He was long attached to the Harvard Observatory; was awarded the gold medal of the Astronomical Society of London in 1896 for his determination of the laws of variations of latitude or movements of the earth's pole and his researches on variable stars. In 1896 he became editor of the *Astronomical Journal*. He is well known for his investigations and observations of the phenomena of variable stars, the computation of comet orbits, and, in connection with Ritchie, for devising a system of astronomical code-telegrams for the announcement of astronomical discoveries. He also invented the Almacantar, and published a very complete treatise on the method of its use.

CHANDLER, William Eaton, American politician: b. Concord, N. H., 28 Dec. 1835; d. 30 Nov. 1917. He was graduated at Harvard Law School in 1855, entered the New Hampshire legislature in 1862, was speaker 1863–64, became judge-advocate-general of the Navy Department in 1865, and Secretary of the Navy in 1882, serving three years. In 1887–1901 he was a United States senator from New Hampshire. In 1901 he became president of the Spanish Treaty Claims Commission, and was a member of the New Hampshire Constitutional Convention in 1902.

CHANDLER, Zachariah, American merchant and statesman: b. Bedford, N. H., 10 Dec. 1813; d. 1 Nov. 1879. He received a common school education, and early in life went to Detroit, and engaged in the dry goods business, in which his energy and ability soon brought success and put him in possession of a handsome fortune. He was mayor of Detroit in 1851, the defeated Whig candidate for governor of Michigan in 1852, an active organizer of the Republican party in 1854, and in January 1857 was elected to the United States Senate to succeed Gen. Lewis Cass. The same energy and ability which had made him successful in business he now applied to the organization of the Republican party and he was soon recognized as one of the most formidable opponents of all plans in favor of slavery. He opposed the admission of Kansas under the Lecompton constitution 1858, and he was the author of the famous "blood letter," in which he said "without a little blood-letting, this Union will not, in my estimation, be worth a rush." Though a warm friend of Lincoln, he was more radical than the latter, and often differed from him in matters

of public policy. In July 1861 he introduced a sweeping confiscation bill which failed to pass and in July 1862 violently assailed McClellan in a speech in the Senate. He was re-elected to the Senate in 1863 and in 1869; served as Secretary of the Interior in the Cabinet of President Grant from 1875–77; was chairman of the Republican National Committee in 1876; was re-elected to the Senate in 1879, where he led the attacks on Jefferson Davis. He was a man of imposing presence, great energy and perseverance. He was found dead in bed on the morning after delivering a political address in Chicago. Consult Curtis, W. E., 'Life of Zachariah Chandler' (New York 1879).

CHANDOGYA, chun'dō-jī'ȧ, the name of a Brahman of the Samaveda in Hindu literature. It is in 10 books, 8 of which are known in the Occident as 'Chandogya Upanishad.' It has been translated by Müller in his 'Sacred Books of the East' (Vol. I).

CHANDOS, the name of a noted English family, descended from a follower of William the Conqueror, the last representative in the direct male line being Sir John Chandos (d. 1428), whose niece married one Giles Brydges, the ancestor of the Brydges family, successively lords and dukes of Chandos. Their descendant, Sir John Brydges, was lieutenant of the Tower under Queen Mary, and was created Baron Chandos in 1554. James Brydges (1673–1744), 8th Lord Chandos, sat in Parliament for Hereford from 1698 to 1714, and was created duke of Chandos in 1719. The lucrative post of paymaster of the forces abroad supplied means for building a palace at Canons, near Edgeware, which cost $1,000,000, but was torn down at the Duke's death. Here Handel lived two years, wrote anthems for the chapel service and produced 'Esther.' In 1796 the title passed by marriage to the family of Grenville, which retained the title of Duke of Buckingham and Chandos till 1889, when the 3d and last duke died. His widow, the dowager Countess Egerton, is still (1918) Duchess of Buckingham and Chandos from her first marriage. The title will die with her.

CHANDOS, Sir **John,** English soldier: d. 1370. He was descended from Robert de Chandos, who came from Normandy with the Conqueror in 1066. The earliest military records about John Chandos state that he was at the siege of Cambrai in 1337, at Crecy in 1346 and Poitiers in 1356, when he rescued his friend, the Black Prince, on the battlefield. He was soon afterward appointed "regent and lieutenant" of the king of England in France, and vice-chamberlain of the royal household. In 1364 he commanded Montfort's and the English forces against Charles de Blois; the latter was killed and the redoubtable Bertrand du Guesclin fell a prisoner to Chandos. In 1367 the Black Prince induced him to join a military expedition across the Pyrenees into Spain against Henry de Trastamare, who was aided by Du Guesclin. In the ensuing battle at Navarette Chandos gained the victory and again captured Du Guesclin. Retiring in 1368, Chandos was again called to arms against the French in 1369. He was wounded and died the following day, 1 Jan. 1370. A gallant, chivalrous warrior and one of the original Knights of the Garter, his death was regretted alike by friend and foe.

CHANDPUR, chŭnd- or chănd'poor, India, a town in the Bijnaur district of the Northwest Provinces, about 40 miles east-northeast of Meerut. It is thriving, well paved and drained; there is a trade in sugar and grain, besides some manufactures of cotton cloth, pipes, etc. Pop. 13,000.

CHANDRA CHATTOPADHYAYA, Bankim, Indian novelist. See Chattopadhyaya Bankim Chandra.

CHANEY, Lucian West, American biologist: b. Heuvelton, N. Y., 26 June 1857. He was graduated at Carleton College in 1878. He spent three years as high school principal and superintendent of schools at Faribault and Glencoe, Minn., and in 1882 was appointed instructor in biology at Carleton College and was professor there from 1883 to 1908. In 1907–09 he was special agent of the United States Bureau of Labor to investigate dangerous occupations of women and children and in 1909 he was appointed expert in industrial hygiene in the same bureau. He has also explored the Rocky Mountain glaciers, one of which bears his name, and has published 'Employment of Women in the Metal Trades'; 'Cotton Mill Accidents'; 'Accidents and Accident Prevention'; 'Conditions of Employment in the Iron and Steel Industry'; 'Accidents and Accident Prevention in Machine Building.'

CHANG-CHAU, chăng'-chow', China, city in the province of Fu-kien, the capital of the department of Chang-Chow, 35 miles west-northwest of Amoy, which is its port. It is on the Kiu-lung estuary. It stands in a valley surrounded by hills and intersected by a river. Its walls are about four and a half miles in circuit, and immediately within is a space planted with large trees. It has broad granite-paved streets with fine stores. The chief building is a Buddhist temple dating from the 8th century. A wooden bridge nearly 800 feet long, resting on 25 stone piles, spans the river. The city has manufactures of silk, sugar, crystal and bricks, and carries on an extensive domestic and export trade in tea and sugar. It is the centre of the silk manufacture of the province. Pop. about 900,000.

CHANG-SHA, chăng'-shā, China, capital of the province of Hu-Nan, on the Siang River, about 350 miles north of Canton. It is not a treaty port, but has an important native trade carried on in small boats. It is surrounded by a wall and has an important silk industry. Pop. 250,000.

CHANGA, a species of mole-cricket (*Scapteriscus didactylus*) indigenous in Porto Rico. The changa is found throughout that island, living in galleries in the earth, and damaging the crown and roots of the tobacco, sugar cane and small crops; it is the most serious insect pest in the island. (See Mole-Cricket). Consult Barrett, 'The Changa, or Mole-Cricket'; 'Bulletin No. 2, Porto Rico Agricultural Experiment Station' (Washington 1902).

CHANGARNIER, shăn-gär'nē-ā, **Nicolas Anne Théodule,** French general: b. Autun, 26 April 1793; d. Versailles, 14 Feb. 1877. He was educated at Saint-Cyr, and went in 1830 to Algeria, where for 18 years he saw much active service. On the proclamation of the republic in 1848 he acted as provisional governor-general

of Algeria, but returned to Paris to take command of the garrisons of Paris and of the national guard. He did much to check the outbreaks of the Anarchist party during 1849. At the *coup d'état* in December 1851, after being imprisoned in Ham, he went into exile till the Franco-Prussian War, when he offered his services to Napoleon III. He was in Metz with Bazaine, and, on its capitulation, retired to Brussels. He returned to France in 1871, entered the Assembly, and assisted M. Thiers in reorganizing the army.

CHANGE OF COLORS. See CAMOUFLAGE.

CHANGE OF FUNCTION. During the metamorphosis of insects, Crustacea, and other animals, organs at first adapted for certain uses become, with change of conditions of life, media, and consequently of habits, adapted to quite different uses or functions. Thus in the young larva (Nauplius) of many of the lower Crustacea, the three pairs of head appendages are formed for swimming; the first two pairs afterward change into the two pairs of antennæ, the third pair becoming the jaws of the adult. In the tadpole, which lives on dead leaves or animal matter, the intestine is very long and coiled, but in after life, when the frog feeds on living insects, it is very much changed in form, being much shorter. These are examples of an ontogenetic change of function. There are many examples of change of function by suppression of the original or chief function, what was a minor use becoming the chief one. Examples of a phylogenetic change of function are the transformation of the jaws of biting insects into the needle-like elements, aiding in the formation of the beak of bugs (q.v.); the transformation of the hypopharynx of caddis-flies into the piercing organ of fleas and flies; the modification of the maxillæ of biting insects into the spiral tongue of the butterfly. The mouth-parts of bees and butterflies lost their primitive functions and adopted entirely new shapes and uses after flowers appeared. Among fishes the clearest example is the change of the swimming-bladder of the gar pike, where it also functions as a breathing organ, until in the lung-fishes, which have probably descended from some ganoid, it becomes a lung.

These changes of functions are due to change of the surroundings, and consequently of habits, finally bringing about change of function. Hertwig states that a muscle may from many causes become functionless, but finally becomes transformed into a ligamentous band. What are the gill-supports of fishes may, as the results in certain of their descendants of the adoption of a terrestrial mode of life, become in part degenerate, while another part persists by assuming a new function, forming the jaws, the hyoid bone and the small bones of the ear, which are morphologically the same structures as the gill-arches. Consult Dohm, 'Der Ursprung der Wirbelthiere und das Prinzip des Funktionwechsels'; Hertwig-Kingsley, 'Manual of Zoology.'

CHANGE OF LIFE. See MENOPAUSE.

CHANGELING, a child left or taken in the place of another. It was at one time a common superstition that young children were liable to be stolen or changed by fairies before being baptized; and hence they were carefully watched till that ceremony was over. It was thought that the fairies were always anxious to change their own starveling elves for the more robust children of men. The children so left were called changelings, and were known by their greater backwardness in growth or learning; hence, stunted or idiotic children were regarded as changelings. The poets allude to this superstition occasionally, e.g., Shakespeare and Spenser.

CHANGO, an Indian tribe inhabiting the rainless region of northern Chilé, near the desert of Atacama. Their territory was formerly much larger and their language, now extinct, appears to have been a distinct stock. Consult Boman, 'Antiquités de la Région Andine' (Vol. I, Paris 1910), and Chamberlain, in *Journal de la Société des Amér. de Paris* (N. S., Vol. VII, p. 183, 1910).

CHANK-SHELL, the shell of a gastropod mollusk (*Turbinella pyrum*). An extensive fishery of these shells, which live in water from 12 to 15 feet deep along the shore of Ceylon and India, has been established at Tuticorin. The shell is a sacred emblem of Vishnu, who is often represented as holding a "sinistral" one in his hand. They are used by the Hindu women as bangles and leg ornaments, or anklets. The chank appears as a symbol on the coins of some of the ancient Indian empires, and is still retained on the coinage of the Rajah of Franvacore.

CHANLER, Amelie Rives. See TROUBETSKOY.

CHANLER, William Astor, American explorer: b. Newport, R. I., 11 June 1867. He studied at Harvard, but left the university to make explorations in Africa. With Chevalier Ludwig von Höhnel, he started from Zanzibar in September 1892 to explore the region east and west of Mount Kenia. They reached the coast on the return journey June 1893. He was elected to the New York legislature in 1897 and to Congress in 1898 as a Democrat. He served in the War with Spain and was commended in General Shafter's reports. He has written 'Through Jungle and Desert' (1896) and 'Travels in Eastern Africa,' etc.

CHANNEL-BILL, a gigantic Australasian cuckoo (*Scythrops Novæ-hollandiæ*), having the size, flight and general appearance of a hawk, brown and gray above and whitish below, with bare scarlet skin surrounding the eyes. It takes its name from two deep grooves in the side of the bill. It is probably parasitic, feeds on both fruit and insects, is migratory and utters a shrieking cry like the syllable "krok."

CHANNEL ISLANDS, a group of islands in the English Channel belonging to Great Britain, off the west coast of the department La Manche, in France. The islands lie 10 to 30 miles distant from the Normandy coast and 50 to 120 miles south of the English coast. They consist of Jersey, Guernsey, Alderney and Sark, with some dependent islets; area, 75 square miles. They are picturesque and very fertile and are celebrated for a peculiar breed of cattle, the chief strains of which are the Jerseys, Guernseys and the Alderneys, which differ from each other in minor characteristics. Boland, 'Les iles de la Manche' (Paris 1904). The islands are almost totally exempt from

taxation and the people enjoy besides all the privileges of British subjects. There are two lieutenant-governors, one for Jersey and the other for Guernsey, Alderney and Sark. The government is in the hands of two corresponding bodies called the "states," some members of which are named by the Crown, while others are chosen by the people and others sit ex officio. These islands have been fortified at an immense expense. Ecclesiastically they belong to the diocese of Winchester. The Channel Islands form the only remains of the Norman provinces once subject to the English Crown. They now export large quantities of fruit, vegetables and flowers to the English markets, including grapes, tomatoes and potatoes, partly grown under glass. The annual yield of potatoes in Jersey exceeds 60,000 tons, valued at $1,320,000. The chief fertilizer is "vraic," or seaweed, the regular gathering of which, controlled by legislation, is one of the characteristic insular scenes. A large quantity of kelp is used in the manufacture of iodine, its value to Guernsey being estimated at $150,000 annually. There are important fisheries of turbot, conger eels, oysters, lobsters, monster crabs, etc. The quarries of Jersey and Guernsey are extensively worked and export fine granite for building purposes. There is daily communication by steamer with various English and French ports and an average of 3,000 vessels of 200,000 gross tonnage enter and clear the Channel Island ports annually. The chief town is Saint Helier, on the island of Jersey.

Among the farming population the vernacular is old Norman French, which differs in peculiarities of spelling and pronunciation in each island and even in parishes of the same island. English predominates in the town districts, which contain a large proportion of British and many French residents.

Military service at fixed periods is compulsory on all male natives and residents. Cave dwellings and numerous megalithic cromlechs, tumuli and menhirs prove the habitation of a prehistoric race; a few old Norman chapels remain; the oldest churches, Saint Brelade's, Jersey, and Saint Sampson's, Guernsey, date from 1111, and earthworks, fortifications and castles dating from Roman and subsequent periods exist. The Romans occupied the islands during the 3d and 4th centuries; Cæsarea (Jersey) and Sarnia (Guernsey) occur in the 'Itinerarium' of Antoninus. After the Conquest the islands alternated between Norman and English rule until 1204, when with the loss of Normandy they remained faithful to England and steadfastly resisted many subsequent attempts on the part of France to capture them. In the reign of Henry VI the French held part of Jersey for six years. During the civil war they were the scene of many notable events. A French expedition landed in Jersey in 1781, but was defeated with great loss. During the French and American wars, the islanders fitted out many privateers and captured many rich prizes. The islands are favorite asylums for political refugees. Their numbers have included Charles II, Earl Clarendon, Victor Hugo and General Boulanger. Lord Tennyson was a frequent visitor. Pop. (1911) 96,900. Consult Ansted, 'Channel Islands' (1893); Boland, 'Les îles de la Manche' (Paris 904).

CHANNELS, or **CHAIN-WALES,** of a ship, pieces of wood or iron projecting edgewise like a ledge from the ship's outside, abreast of and extending somewhat behind the masts. They serve to extend the shrouds and to prevent them from touching the gunwale or being injured by rubbing against it.

CHANNING, Edward, American historian: b. Dorchester, Mass., 15 June 1856. He graduated at Harvard in 1878, and in 1883 was appointed instructor in history there, becoming successively assistant and full professor of history and is now McLean professor of ancient and modern history. He has written 'The Narragansett Planters' and 'Town and County Government of the English Colonies in North America' (Johns Hopkins Studies, 1883–84); 'Columbus and His Companions,' in Winsor's 'Narrative and Critical History of the United States' (1888); 'The United States, 1765–1865'; in collaboration with A. B. Hart and F. J. Turner, 'Guide to the Study of American History' (1912); and with T. W. Higginson, 'English History for Americans'; 'Students' History of the United States' (1898); 'History of the United States,' Vol. I, 'The Planting of a Nation in the New World, 1000–1660' (1905); Vol. II, 'A Century of Colonial History, 1660–1760' (1908); Vol. III, 'The American Revolution, 1761–1789' (1912); 'The Jeffersonian System' (1906).

CHANNING, Edward Tyrrel, American scholar: b. Newport, R. I., 12 Dec. 1790; d. Cambridge, Mass., 8 Feb. 1856. He was a brother of William Ellery Channing, 1780–1842 (q.v.). He studied law with his elder brother, Francis Dana Channing, in Boston, and was admitted to the bar. He gave his attention chiefly to literature and carried forward a careful and critical study of the Greek and Roman classics, with that of the great writers of England. The *North American Review,* the earliest permanent periodical in America, had its origin in a club of young men, who, in the winter of 1814–15, projected a bi-monthly magazine. Willard Phillips, afterward author of the celebrated works on the law of insurance and of patents, was to be its editor. The committee on politics was composed of George Cabot, James Lloyd, John Lowell, Josiah Quincy and others. The chief managers were to be President Kirkland, Jared Sparks, George Ticknor, Mr. Channing, Richard H. Dana and John Gallison. At this time, William Tudor, author of the 'Life of James Otis,' returned from Europe with a matured plan for a quarterly review; and as the field was not large enough for two such works, the plan of the magazine was merged in that of Mr. Tudor, and the first number of the *North American Review* was issued in May 1815, as a bi-monthly, the quarterly publication not being adopted until the commencement of the eighth volume. Tudor edited it for two years and in 1817 it passed under the control of a club. Jared Sparks was chief editor for one year when the duty was undertaken by Channing, aided by his cousin, Richard H. Dana. In October 1819, Mr. Channing was succeeded in the editorship of the *Review* by Edward Everett, having been appointed Boylston professor of rhetoric and oratory in Harvard University. This post he held for 32 years, resigning it in 1851. During all this

time, the department of rhetoric and oratory, including the charge of all the English compositions of the students which had great influence over their reading and taste, was filled by him with more than satisfaction to the public of reading and thinking men. A volume of his letters was published in 1856 with a memoir by R. H. Dana.

CHANNING, William Ellery, American Unitarian clergyman: b. Newport, R. I., 7 April 1780; d. Bennington, Vt., 2 Oct. 1842. Entering Harvard College at 14 he took his degree in 1798 and though at first inclining to the study of medicine, presently decided upon the profession of the ministry. After his graduation he spent two years in Virginia as a tutor, but in pursuance of his ascetic views regarding renunciation and the necessity of subduing the animal nature, he endeavored to accustom himself to hardships during this period, even denying himself sufficiency of food and clothing. The result of this unwise course was to implant in him the tendency to disease that made him for the greater part of his career a semi-invalid. Returning from Virginia he took up the study of theology, making at the start a careful study of the evidences of Christianity, wishing, as he said, to know what Christ taught and not what men made him teach. In 1801 he was made regent of Harvard, the duties of this office being light and the salary sufficient for his support while continuing his studies. In 1802 he preached his first sermon at Medford, Mass., from the text "Silver and gold have I none; but such as I have, give I thee." In 1803 he was ordained pastor of the Federal Street Church in Boston and continued in that relation for the rest of his life. In the earlier years of his ministry the denominational spirit was not especially strong in him and with the ministers of the Trinitarian churches in Boston, he was on most friendly terms. His opinions were ripening during this period, however, and in 1819, at the ordination of Rev. Jared Sparks in Baltimore, he preached a sermon in which for the first time he gave free expression to the principles of Unitarian Christianity, upholding the exercise of reason in religious matters; declaring the Bible to be "a book written for men in the language of men and its meaning to be sought in the same manner as that of other books." He also objected to the doctrine of the Trinity, affirming his belief that Christ was distinct from and inferior to God, and sent to men as a great moral teacher, not as a mediator between erring man and offended deity. This discourse gave rise to much controversy and fixed definitely the Unitarian position as distinguished from that of the Trinitarians. It made him, moreover, the recognized leader of American Unitarianism, and much as he disliked controversy he never hesitated from uttering what he believed to be true because of hostile criticism. His greatest dread was of becoming creed-bound and thus losing perception of new truths, and he even spoke of himself as "little of a Unitarian," and standing aloof "from all but those who strive and pray for clear light, for a purer and more effectual manifestation of Christian truth." After 1824 Rev. Ezra Stiles Gannett was associated with him in the ministry of the Federal Street parish and from this epoch his time was largely given to philanthropic and literary work, the asceticism of his youth having long since been supplanted by a more wholesome understanding of life and its requirements and duties. He visited Europe in 1822 and became acquainted with Coleridge and Wordsworth. He was one of the first to acknowledge the greatness of the latter, and save Shakespeare, he read no poet oftener. Channing was a fearless defender of freedom and upheld Garrison when that great abolitionist was the most generally detested person in Boston. In the pulpit his mission, as he saw it, was to free men's minds from servile conceptions of God, to disabuse religion of its benumbing terrors and to show forth to men the real significance of their moral natures. His writings on theological, social and philanthropic themes have received the widest circulation and been translated into French, Italian, German, Icelandic, Russian and Hungarian. The most notable of them include 'Evidences of Revealed Religion'; 'Essay on National Literature' (1823); 'Remarks on the Character and Writings of John Milton' (1826); 'Character and Writings of Fénelon' (1829); 'The Duty of the Free States' (1835); 'Negro Slavery' (1835); 'Self Culture' (1838). He had a life-long abhorrence of slavery, but in his 'Duty of the Free States' his feelings on the subject find fullest expression. His name, moreover, was associated with the most of the social reforms of his day and besides bearing a part in the great anti-slavery agitation, he warmly sympathized in the temperance movement, was an ardent lover of peace and deeply interested in schemes for educational advance. He stood for intellectual and spiritual ideas and foresaw dangers both to nations and individuals in the spread of materialism, in the contented adoption of inadequate aims, complacent satisfaction with perishable interests. In an age when comparatively few religious leaders dared to think outside of narrow prescribed limits, Channing stood forth as the intellectual champion of freedom. Much of his influence may have been due, no doubt, to the singular sweetness of his disposition and his entire nobility of character, but more of it was due to the fact that he spoke with utter fearlessness and thus inspired other men to free themselves from the fetters of dogma or of intellectual timidity. Although two generations have passed since his death, his name is still both familiar and beloved and his beneficent influence, far from lessening its hold upon men, has deepened and widened with the years. Channing's literary style, while not highly ornamental, was both clear and vigorous and his sentences were usually short and direct, though it is said that his personal preferences in the writings of others were for long and involved sentences. On 1 June 1903, a bronze statue of Channing by Herbert Adams was unveiled in the public garden in Boston, Mass., its site being opposite the Arlington Street Church, the successor of the Federal Street Church, of which he was so long pastor. The statue and its monumental setting were the gift of John Foster to the city. Consult 'Lives' by W. H. Channing and C. T. Brooks (3 vols., London 1848, and reprinted Boston 1880); 'Correspondence of Channing and Lucy Aiken'; Peabody, 'Reminiscences'; Chadwick, 'W. E. Channing' (Boston 1903);

and Eliot, 'Four American Leaders' (Boston 1906).

CHANNING, William Ellery, American poet, nephew of William Ellery Channing, the elder: b. Boston, Mass., 10 June 1818; d. Concord, Mass., 23 Dec. 1901. After some years spent in newspaper work he retired to Concord, where he lived the life of a recluse. His writings include 'Poems' (1843–47); 'The Woodman' (1849); 'Near Home' (1858); 'The Wanderer' (1872); 'Conversations in Rome' (1847); and 'Youth of the Poet and Painter'; 'Thoreau, the Poet-Naturalist' (1873); 'Eliot'; 'John Brown.'

CHANNING, William Henry, American clergyman: b. Boston, 25 May 1810; d. London, 23 Dec. 1884. His father, Francis Dana Channing, died when he was very young. He graduated at Harvard College in 1829, and entering the Unitarian ministry preached with much success in Meadville, Pa., New York, Cincinnati, Nashua, Boston and Rochester. Settling in England, he succeeded James Martineau as pastor of the Hope Street Chapel in Liverpool, 1852–62. He was for two years chaplain of the Senate at Washington, but from the close of the Civil War lived entirely in England. He published 'Memoirs of Dr. William Ellery Channing' (1848); 'Life and Writings of James H. Perkins'; 'Memoirs of Madame Ossoli (Margaret Fuller),' in connection with R. W. Emerson and J. E. Clarke (1852). His addresses and discourses were often extemporaneous and delivered in a style highly impassioned and imaginative. During a considerable part of his career he was an earnest advocate of social reform. He wrote for the *North American Review,* the *Dial,* the *Christian Examiner* and other magazines. See 'Life,' by Frothingham (Boston 1886).

CHANNUKAH, Hän' nạ-kä. See BEFANA.

CHANSON DE ROLAND, the culmination of a cycle of 'Chansons de Geste' or 'Songs of Valor,' celebrating the heroic achievements of Charlemagne. Its date is proved to be not later than 1095, possibly as early as 1066. They are inspired especially by the joy and pride of the triumph of Christian arms over the Mohammedan invasion, which, through the gate opened by the Moors of Spain, threatened to subdue all Europe. The subject of the poem is the avenging of the death of Roland at Roncesvalles by Charlemagne. The French text of the 'Chanson' was first published in Paris by M. Francisque Michel in 1837, and afterward in 1850 by M. F. Genin. Tyrwhitt, in his edition of Chaucer, was the first to call the attention of English readers to the 'Chanson'; but English tradition has it that the song was sung by the Norman Taillefer just before the battle of Hastings. The best and oldest French manuscript, called the 'Digby,' is preserved in the Bodleian library at Oxford. The French poem contains 6,000 lines. A fragment of 1,049 lines, translated in Middle English from what is known as the Lansdowne manuscript, is published by the Early English Text Society. The first modern edition is by Michel (Paris 1837). Consult editions by Müller (Göttingen 1878); Gautier, Leon (Tours 1872 et seq.); Stengel (Heilbronn (1888); Seelmann, 'Bibliographie des altfranzösischen Rolandliedes' (Heilbronn 1888); Paris, Gaston, 'La poésie du moyen âge' (1885–1906); Gröber, Gustav, 'Grundriss der römanischen Philologie' (Strassburg 1904); Gautier, Leon, 'Les épopées françaises'; Becker, P. A., 'Grundriss der altfransözischen Litteratur' (1907); Hart, W. M., 'Ballad and Epic' (1907); Wright, C. H. C., 'History of French Literature' (London 1912); Stengel, Edmund, 'Das altfranzösische Rolandslied' (1900).

CHANT, Laura Ormiston Dibbin, English lecturer and reformer: b. Chepstow, Monmouthshire, 1848. In 1876 she was married to Thomas Chant. She has taught in schools as well as nursed in hospitals and has lectured widely both in England and the United States on literary and scientific subjects, being a prominent advocate of woman's suffrage and temperance. In the crusade against the Empire Music Hall, London, she played an important rôle. In the Bulgarian wars she took relief to the Armenian refugees, and at the time of the Græco-Turkish War she took nurses to the Greek frontier and Crete. She has published 'Verona and Other Poems'; 'Short Stories,' and several collections of original songs.

CHANT, a short musical composition adapted to the singing of the psalms and canticles. Chants are single when adapted to a single verse, and double when adapted to two verses, the former consisting of two strains of three and four bars respectively, and the latter being twice that length. More recently quadruple chants extending over four verses have been introduced. The complete chant consists of four parts, namely: (1) The intonation or initial phrase leading up to the reciting note; (2) the reciting note, which is the dominant of the mode employed; (3) the mediation, or main body of the chant; and (4) the termination or concluding phrase. In modern Anglican chants, however, there is no intonation. The origin of the plain song of the Church is unknown, but the first attempt to reduce the traditional music to some definite system was made by Saint Ambrose, bishop of Milan (d. 397). More important, however, by far is the Antiphonarium of Gregory the Great, which appeared in the latter half of the 6th century and soon established itself as the chief and in fact only authority on Church music. The Gregorian tones were introduced into England by Saint Augustine, and in the course of their history in that country they underwent many modifications in the various local "uses." During the civil war and the Commonwealth they went out of use, but were revived at the Restoration. Not long afterward, however, the Gregorian chants began to give place to the modern double chants, and it is only in quite recent years that attempts have been made to revive them. A new impetus has been given to the use and popularization of plain chant in recent times by the first encyclical letter of Pius X, his "*motu proprio*" and the introduction of Gregorian music in all the Catholic churches throughout the world. See GREGORIAN CHANT.

CHANT DU DÉPART, shäṅ dü dā-pär (Fr. "Song of Departure"), a popular French military song of the period of the Revolution, written by the poet Marie Joseph Chenier, to the music of Méhul. The occasion for its com-

position was the celebration of the fifth anniversary of the taking of the Bastille.

CHANTABON, shăn-tă-bŭn′, or **CHANTIBAN,** Siam, an important commercial port on the east side of the Gulf of Siam, near the mouth of the Chantiban River. It is occupied by the French as security for fulfilment of the treaty of 1893. It is a place of considerable trade. Pop. 30,000.

CHANTAL, shăń-tăl, Baroness de, Jane Frances Frémyot (frām-yō), SAINT, French devotee, foundress of the order of the Visitation B. V. M.: b. Dijon, France, 1572; d. Moulins, 13 Dec. 1841. She married C. de Rabutin, Baron de Chantal, who died 1600. After his death she devoted her life to charity. The institution of the Visitation nuns was founded in 1610 at Annecy, and at her death it had 87 houses, and 60 years later 150 houses with 6,000 inmates — nuns and girls receiving a secular and religious education. She was canonized by Clement XIII in 1767; her day in the Roman Calendar is 21 August. Her life and letters were published at Paris (1874–79).

CHANTECLER, shān-t′-klār′. The most original play of Edmond Rostand, although by no means his best, is 'Chantecler,' produced in 1910. The public, which had first been captivated by the dashing 'Cyrano de Bergerac,' and then charmed by the more ambitious 'L'Aiglon,' had for a decade yearned for another piece from the poet's pen. When it came, after judicious heralding, it proved, to many, something of a disappointment. A *tour de force,* brilliant, witty and novel, it was nevertheless seen to stand apart from the main development of the modern drama. Rostand, as a romanticist, had sought to clothe with unconventional garb figures to be used in a satire. From his observation of barnyard animals he caught the notion of presenting contemporary society in hide and feathers. Accordingly, he offered a dramatic fable, its central theme the faith of Chantecler, the cock, in his mission as the bringer of the dawn. Chantecler believes that his joyous song directly evokes the sunrise. Great is his distress to find, when the envious Hen Pheasant has screened his eyes with her wing and made him forget his task, that the dawn has brightened without him, and that he and his work are of little moment in the scheme of creation. Yet he will leave the forest whither the Hen Pheasant has beguiled him, and return to his barnyard to proclaim, though he cannot produce, the day. His companion, freshly enthralled by this evidence of his courage in defeat, flies up to protect him by diverting to herself the attention of a hunter, but, caught in a snare, she dies. Incidentally, the play laughs at the social climbers who attend the Guinea-Fowl's five o'clock tea, at the cynical Blackbird, the fancy cocks who are fops and faddists, and the spiteful birds of night. More sympathetic are the hero, Patou the dog, a good old idealist, and the Hen Pheasant, who represents woman the enchantress, piqued by man's devotion to his work, yet ready to lay down her life for him. The style of this fantasy is a marvelous mixture of poetry and slang, witty quips and smart local allusions jostling passages of lyrical beauty. No translator could hope to render its rich and poetic quality, although the English versions of Gertrude Hall (1910) and J. S. Newberry (1911) are worthy attempts toward this end. M. F. Liberma has written a critical analysis of the play entitled 'The Story of Chantecler' (1910).

FRANK W. CHANDLER.

CHANTERELLE, an edible mushroom (*Cantharellus cibarius*) of a bright orange color, with a pleasant fruity smell, growing in woods and on dry pastures. See MUSHROOM.

CHANTIBUN. See CHANTABON.

CHANTILLY, shăń-tē-yē, France, town in the department of Oise, 25 miles north-northeast of Paris, on the Nonnette, celebrated for its two splendid châteaux. The smaller of the two châteaux is of recent construction and is regarded as one of the finest specimens of French Renaissance. The older and larger château was made famous by the presence of the most brilliant men of the time, La Fontaine, Racine, Molière, La Bruyère and Boileau. In 1632 it passed to the house of Condé, but the greater part was demolished at the Revolution. The last Prince of Condé bequeathed the domain to the Duc d'Aumale in 1830. The present building and domain, including fine grounds and gardens, an extensive forest, etc., were presented by the Duke to the French Institute in 1886. The château contains a valuable library and a precious collection of works of art. The place was formerly celebrated for its manufacture of lace ("Chantilly lace"), but the manufactures have fallen off. It is a great horse-racing and training centre with a fine course, and noted for the three annual race meetings held here. Pop. 5,556.

CHANTILLY, shăn-tĭl′lĭ, or **OX HILL, Battle of.** On 31 Aug. 1862, the day after the second battle of Bull Run, General Lee marched his army by way of Sudley Ford around Pope's right at Centreville, to seize Fairfax Court-House and interpose between Pope and Washington; and at night Jackson, who was in advance, bivouacked six miles west of Chantilly, on the Little River turnpike, Longstreet some distance in rear. Next morning General Stuart informed Jackson that a part at least of the Union army was at Fairfax Court-House, and that Pope's trains were passing on the road from Centreville to that place. Jackson moved cautiously toward Fairfax Court-House, and on reaching Ox Hill, three miles east of Chantilly, was informed by Stuart that the Union force seemed very strong on the road in front. Then Jackson formed line on Ox Hill ridge, his artillery massed on the left of the road, his infantry on the right, extending in the direction of the Centreville road. He had not completed his formation when he became aware of an approaching force from the Centreville road, upon which he strengthened his right and threw out skirmishers. About 1 P.M. Pope, who had heard of Jackson's advance toward his rear, sent Gen. I. I. Stevens with nine regiments, about 3,000 men, of Reno's corps to gain the road two miles east of Chantilly and hold Jackson in check until the army could be brought into position at Fairfax Court-House. Stevens moved from near Centreville across the fields, unexpectedly struck Jackson's advancing skirmish-line, thrown out from his right, and drove it back into a body of woods. Jackson then advanced a regiment from the woods,

which was immediately driven back by Benjamin's battery. Stevens now formed a column of assault, six regiments in three lines, two regiments in a line. At 4.30 P.M. he placed himself in the centre of this column of 2,000 men, on open ground, and ordered it forward, Benjamin shelling the woods in front. Not a sight nor sound betrayed the presence of an enemy, until the advancing column, ascending a gentle slope, came to within 75 yards of the woods, when from a worm fence bordering them came a terrible volley from Branch's brigade, smiting the column with great effect, men going down by the score. At first it began to waver, but quickly bracing up returned the fire; five color-bearers of the 79th New York, Stevens' old regiment, went down in succession. The assault was checked, Stevens ran forward, seized the colors and, calling upon his men to follow him, all rushed forward, routed Branch, and gained the fence, Stevens falling dead on it, with a bullet through his brain and the colors upon his head and shoulders. The column pushed on into the woods. At the moment of reaching the fence a sudden and terrific thunderstorm and fierce gale burst over the field, blowing the rain into the faces of the men on both sides, impeding their movements and wetting their ammunition. Jackson brought up fresh men, and after a contest of more than an hour the six regiments were driven out of the woods and fell back to the point where they had formed, and on the right of where Birney's brigade of Kearny's division had come up. Meanwhile three regiments of Reno's command had been sent in on Stevens' right, one only of which, the 21st Massachusetts, became seriously engaged and was repulsed with great loss. General Kearny now came up with a battery, which he put in position and went to the right for a regiment to fill an interval on Birney's right. He met the 21st Massachusetts as it came out of the woods, and was leading it to the left when his attention was called to the fact that the Confederates were advancing from the woods and through a cornfield on Birney. He spurred his horse into the cornfield to reconnoitre, ran upon a skirmish-line, saw his mistake and turned to ride back, when he was shot through the body and killed. A sharp encounter ensued between the 21st Massachusetts and the Confederates, which was ended by darkness; the regiment withdrew, the Confederates retired to the woods and the battle was ended, neither side having permanently gained a foot of ground. The other two brigades of Kearny came up, and the ground was held until 3 o'clock in the morning of the 2d, when Kearny's and Reno's men fell back to Fairfax Court-House after the last of Pope's army from Centreville had passed. Pope fell back to Washington, and Lee marched to cross the Potomac into Maryland. The Union loss at Chantilly was about 800; that of the Confederates about 700. In the death of Kearny and Stevens the Union army lost two of its best officers. Consult 'Official Records' (Vol. XII); Stevens, Hazard, 'Life of General I. I. Stevens' (Vol. II); Gordon, G. H., 'Army of Virginia.'

E. A. CARMAN.

CHANTREY, chăn'trĭ, SIR **Francis Legatt,** English sculptor: b. Jordanthorpe, Derbyshire, 7 April 1781; d. 25 Nov. 1841. The chief amusement of his boyhood was in modeling figures in clay and drawing likenesses and at his own request he was apprenticed in 1797 to a carver and gilder at Sheffield. Here he attracted the attention of J. Raphael Smith, a mezzotinto engraver and portrait-painter, who, perceiving his decided inclination for drawing and modeling, gave him instructions, which tended greatly to prepare him for his future career. He then set up as a portrait-painter. By 1802 he was resident in London, studying at the Royal Academy. Having acquired much reputation as a sculptor, he became the successful candidate for the marble bust which the inhabitants of Sheffield had resolved to erect to the memory of the Rev. J. Wilkinson (1805–06). This interesting work, which may be said to have finally decided his future course, is in Sheffield Parish Church. Having settled permanently in London, he presented numerous busts at the exhibitions of the Royal Academy. About the same time he was a successful candidate for a statue of George III for the city of London, and soon was almost universally regarded as the first monumental sculptor of the day. In 1815 he was chosen an associate and in 1818 a member of the Royal Academy. In 1819 he visited Italy, where he was elected member of the academies of Rome and Florence. He was knighted in 1835. His most celebrated works are the 'Sleeping Children,' a monument erected to two children of the Rev. W. Robinson, in Lichfield Cathedral; the statue of Lady Louisa Russell, daughter of the Duke of Bedford, in Woburn Abbey; Lady Frederica Stanhope with her infant child, in Chevering Church; Sir Joseph Banks, at the British Museum; Roscoe and Canning, at Liverpool Town Hall; James Watt, at Glasgow; the bronze statue of William Pitt, in Hanover square, London; and statues of Horner, Sir J. Malcolm, etc., in Westminster Abbey, and a statue of Washington in the State House at Boston, Mass. His finest works are his busts, among the best of them being Sir Walter Scott, James Watt, Wordsworth and Porson. His full-length figures are said to betray an insufficient acquaintance with anatomy, and several of his equestrian statues in bronze are still more defective. The postures are formal, and the horses, in their bodies and limbs are very inanimate. He made munificent bequests, amounting to £150,000, for the advancement of art, the Royal Academy being endowed with a large fund known as the Chantrey Bequest for the purchase of works of sculpture and painting by artists residing in Great Britain. See 'Lives' by Jones (1849); and Raymond (1904).

CHANTRY (old French, *Chanterie*), an ecclesiastical endowment to provide for the celebration of masses for the prosperity of the living or repose of the dead. Previous to the Reformation chantries were very numerous, almost every family of importance having founded one or more. Wealthy founders would endow a church or monastery, in which religious services should be celebrated continually. For less wealthy founders, an altar in the church of the locality was made to suffice. Sometimes small chapels, called chantry chapels, were appended to the main edifice and occasionally, as at Wakefield and Bradford-on-Avon, such chapels

were erected on bridges. The residences of priests engaged in the services were known as chantry-houses, chantries or colleges. The Chantry schools were widely spread over England prior to the Reformation. Chantries were finally dissolved in England by King Edward VI, and nearly all endowments were devoted to the purposes of the Crown. For the text consult Gee, Henry, 'Documents Illustrative of the History of the English Church,' pp. 328–57 (London 1896).

CHANUTE, chą-noot', Kan., city in Neosho County, 125 miles southwest of Kansas City, Mo., on the Atchison, Topeka and Santa Fé and the Missouri, Kansas and Texas railroads. The city was incorporated in 1873, and adopted the commission form of government in 1912. Manufactories here include railroad shops, glassworks, brick and cement plants, smelters, drilling-tool works and flour mills. The United States census of manufactures for 1914 recorded 27 industrial establishments of factory grade employing 190 persons, of whom 131 were wage earners, receiving $69,000 annually in wages. The capital invested aggregated $430,000, and the year's output was valued at $496,000: of this $234,000 was the value added by manufacture. Most of the industrial plants utilize the abundant natural gas of this locality, which is also used for lighting and various domestic purposes. The recent discovery of extensive oil-fields in the vicinity has led to a new and important industry, over 2,000 productive oil-wells having been opened. This industry promises rapid growth for the city, and also developments of great importance to the State. Pop. 11,000.

CHANZY, shäñ-zē', **Antoine Eugène Alfred,** French general and politician: b. Nouart, Ardennes, 18 March 1823; d. Châlons-sur-Marne, 4 Jan. 1883. After a course at the military school of Saint-Cyr, he became sub-lieutenant of infantry in 1843, and was sent to Algeria and eventually became major. He subsequently served in Italy and Syria, but on becoming colonel he returned to Africa in 1868. On the outbreak of the war with Germany, in 1870, he was created a general of division, and after gaining the battles of Coulmiers and Patay, was put in command of the second army of the Loire. Here he fought heroically against the much stronger and more disciplined Germans, but finally had to retreat. He was elected to the National Assembly for the department of Ardennes, and during the Commune he narrowly escaped with his life. When peace was declared he was elected to the National Assembly and became in 1872 commander of the Seventh Army Corps. In 1873 he went to Algeria as governor-general, in 1875 was elected life senator and in 1879 he stood for the presidency. In that year also he was sent to Russia as Ambassador, a post which he held till 1881, when he became commander of the Sixth Army Corps. He published 'La deuxième armée de la Loire' (1871). Consult biographies by Chuquet (Paris 1884) and Villefranche (Paris 1890).

CHAO-CHOW, chow'-chow', China, a city in the province of Kwang-tung, on the river Ham, 195 miles northeast of Hongkong. It is the centre of an important maritime division of the province. The channel leading to it is very shallow, so that ships of large burden can sail up only at high water. This city was included in the Treaty of Tientsin (1858) as a port open to foreign trade, but the foreign trade is transacted at Swatow. Pop. estimated about 200,000.

CHAOS, according to the signification of the word, the void which embraces all things. Hesiod mentions, as the original principles of all things, Chaos, Earth and Eros (Love); other ancient poets made Chaos alone the primæval source from which everything is derived; others added to it Night, Erebus and Tartarus; and others still represented Chaos as the parent of the Earth and Heaven; after the production of which Eros (Love) completed the creation. Modern writers commonly understand by chaos the uniform primæval matter from which the universe was made.

CHAP-BOOKS, a species of cheap literature, in the form of small pamphlets, which preceded the popular periodicals of the present day and were so called because prepared expressly for sale by the chapmen, or pedlars, who hawked them from district to district. They were largely productions of the provincial presses. The writers are mostly unknown, but one of the author of Scottish chap-books was Dougal Graham (1724–79), bellman of Glasgow. Their matter was of the most varied character, including theological tracts, lives of heroes, martyrs, interpretation of dreams, fortune telling, weather forecasts, stories of ghosts, giants and witches, and songs and ballads. After 1800 the chap-books declined in popularity, and were succeeded by the *Penny Magazine* and other cheap publications. Collections of chap-books are now found only in the libraries of bibliophiles. Consult 'Notices of Fugitive Tracts and Chap-Books' (Percy Society, Vol. XXIX, London 1851); 'Popular English Histories' (Vol. XXIII, 1848); Ashton, 'A History of the Chap-Books of the Eighteenth Century' (London 1882); Fraser, 'Humorous Chap-Books of Scotland' (1873); Faxon, 'Ephemeral Bibelots,' in 'Bulletin of Bibliographical Pamphlets' (Boston 1903); "Catalogue of American and English Chap-Books," in 'Bibliographical Contributions,' No. 56 (Cambridge 1905). Consult also Nisard, 'Histoire des livres populaires' (Paris 1854), and Simrock, 'Deutsche Volksbücher' (13 vols., Berlin 1839–67).

CHAPAIS, shă-pā', **Joseph Amable Thomas,** Canadian journalist and statesman: b. Saint Denis de la Bouteillerie, Quebec, 1858. He was graduated at Laval University in 1879 and was called to the bar in the same year. From 1879 to 1884 he was private secretary to the lieutenant-governor of Quebec and from 1884 to 1901 edited *Le Courier du Canada* (Quebec). He became a member of the legislative council in 1892 and was made speaker in 1895. In 1893 he was a member of Taillon's Cabinet and in 1897 was Minister of Colonization and Mines. In the latter year he retired from public life and was appointed professor of history in Laval University. He was made chevalier of the Legion of Honor in 1902. His published works include 'Les congregations enseignantes et le brevet de capacité' (1893); 'Discours et conférences' (1898); 'Le serment du roi' (1901); 'Jean Talon, intendant de la Nouvelle France' (1904); Mélanges de

polémique et d'études religieuses, politiques et littéraires' (1905); 'Le Marquis de Montcalm 1712–1759' (1911).

CHAPALA, chä-pä'lą, Mexico, a lake on the high plateau of Jaliso, surrounded by steep, bare mountains. It has an estimated area of 1,300 square miles, and contains many islands. The Rio Lerma is its chief tributary stream, entering from the east; its outlet is the Rio Grande de Santiago.

CHAPARRAL-COCK, chă' pa-ral'. See ROAD-RUNNER.

CHAPEAUX, shä-pō (Fr. "hats"), a name applied to the partisans of France in Sweden in the 18th century, while those of Russia were called *bonnets* (caps). Having instigated war against Russia in 1741, and again in 1756, the calamities thus inflicted upon Sweden impaired the popularity of the *chapeaux*. Succeeding in 1769 in regaining their former position, the party was soon extinguished altogether by the advent of Gustavus III and his reforms. The same names were also formerly applied in the French Academy, the *chapeaux* constituting the party supported by the philosophers and the public, and the *bonnets* that partly upheld by the clergy and the court.

CHAPEL (Fr. *chapelle*, Lat. *capella*), a name for religious edifices of various kinds, especially for such as hold a subordinate position. In England and Scotland there are several kinds of chapels — parochial chapels, subordinate to, but distinct from, the mother church; chapels of ease, built for the accommodation of the inhabitants, in large parishes; university chapels, and private chapels, whose names explain their uses. The term is also applied to small buildings attached to cathedrals, and separately dedicated. In England Nonconformist places of worship are commonly called chapels in distinction from those of the Established faith to which the term church is applied. In the early history of Massachusetts Bay Colony the Congregational body was the established church, and the first Episcopal church in Boston was consequently termed a chapel, retaining that name, "King's Chapel," to the present time. (See KING'S CHAPEL). The word chapel is also applied to an association of union workmen in a printing-office for the purpose of promoting and enforcing order among themselves. Consult Bond, 'Westminster Abbey' (London 1909); Martin, 'Manual of Ecclesiastical Architecture' (Cincinnati 1897); and article "Chapelle" in Viollet-le-Duc, 'Dictionnaire raisonné de l'architecture française).

CHAPEL HILL, N. C., town in Orange County, on the Southern Railroad, 28 miles northwest of Raleigh. It is a lumbering centre and has cotton and knitting mills and a woodworking plant. It is the seat of the University of North Carolina and has a Carnegie library. Chapel Hill was incorporated in 1851 and its government is vested in a mayor and council. Pop. 1,149.

CHAPEL ROYAL, in the Church of England, a body composed of two deans, 36 royal chaplains, 10 priests, a lay choir and an organist. The services are performed in an oratory in Saint James's Palace. In Scotland such appointments are purely honorary, carrying neither emolument nor any special duty.

CHAPELAIN, shăp-lăn', **Jean**, French poet, one of the earliest members of the French Academy; b. Paris, 4 Dec. 1595; d. there, 22 Feb. 1674. Having gained a high literary reputation, after writing a preface for Marine's 'Adone,' translating Aleman's 'Guzman de Alfarache' and composing four odes, he conceived the project of writing an epic on Joan of Arc, 'La Pucelle,' which proved a total failure, although he spent over 20 years on it. The first 12 cantos appeared in 1656; and to so high a pitch had public expectation been wrought, that notwithstanding the adverse criticism of Boileau and Voiture, six editions came forth within the following 18 months. Eight new parts appeared in 1757, and the concluding four parts, which never were printed, are in manuscript in the Imperial library of Paris. Richelieu, to whom he dedicated a poem and whom he assisted in concocting literary works, conferred a pension on him; he presided over the organization of the French Academy, took a conspicuous part in the early labors of that body, sat as academical critic upon Corneille's 'Cid' and possessed during nearly 40 years a literary prestige, which was broken by his 'Pucelle,' although he remained in favor with the court. Consult his 'Lettres' (ed. in part by T. de Larroque, 2 vols., Paris 1880–82); 'Lettres inédites,' ed. by L. G. Pellissier (1894); Duchesne, Julien, 'Les poèmes épiques du XVIIIe siècle' (1780); Fabre, A., 'Les ennemis de Chapelain' (1888); Molènes, E. de, 'La Pucelle par Jean Chapelain' (Paris 1891); Fabre, 'Chapelain et nos deux premières Académies' (Paris 1890); Mühlan, A., 'Jean Chapelain: Eine, biographisch-kritische Studie' (Leipzig 1893); Searles, 'The Library of Jean Chapelain' (Chicago 1910); Saintsbury, George, 'History of Criticism' (Vol. II, 1911).

CHAPELLE, shă-pĕl', **Placide Louis**, American Roman Catholic prelate: b. in the diocese of Mende, France, 28 Aug. 1842; d. New Orleans, La., 9 Aug. 1905. He studied at the College of Enghien, Belgium, but in 1858 came to the United States and after completing his theological course at the Baltimore Seminary, was ordained priest by Archbishop Spalding in June, 1865, the missions of Montgomery County, Md., being the scene of his first ministerial duties. In 1871 he was made assistant at Saint John's Church and afterward rector of Saint Joseph's Church, Baltimore, whence he was appointed to the rectorship of Saint Matthew's Church, Washington. He became vice-president of the Bureau of Catholic Indian Missions and helped to found the Catholic University. On 21 Aug. 1891, he was made coadjutor to the bishop of Santa Fé; in 1893 was elevated to the titular archiepiscopal see of Sebaste and in less than a year succeeded Archbishop Salpointe in the see of Santa Fé. However, he was soon transferred to the diocese of New Orleans, assuming his new charge on 10 Feb. 1898. In September 1898 Pope Leo XIII appointed him apostolic delegate to Cuba and Porto Rico, in 1899 the Philippines being added to his care. Subsequently he spent three months

in the discharge of his official duties in his country's new possessions. Within eight months he consecrated four bishops for Cuba, and three more for sees in other places. He died at New Orleans of yellow fever.

CHAPERON, shăp'ē-rōn, a cap or hood. Such a covering is worn by Knights of the Garter, and was at one time in general use, but was later appropriated to doctors and licentiates in colleges. A person who acts as a guide and protector to a lady at public places is called a chaperon, probably from this particular piece of dress having been used on such occasions. The name was also applied to devices which were placed on the heads of horses at pompous funerals.

CHAPIN, Anna Alice, American author: b. New York, 16 Dec. 1880. She was educated privately and studied music under Harry Rowe Shelley. In 1906 she was married to Robert Peyton Carter. She early began to write, publishing her first work at 17. Her works include 'The Story of the Rhinegold' (1897); 'Wonder Tales from Wagner' (1898); 'Wotan, Siegfried and Brünnhilde' (1898); 'Masters of Music' (1901); 'Discords' (1905); 'Lady Calmore's Flirtations' (1903); 'Babes in Toyland,' with Glen McDonough (1904); 'Makers of Song' (1905); 'The Stronger Call' (1905); 'The Heart of Music' (1906); 'The Deserters,' with R. P. Carter (1910); 'Königskinder' (1911); 'The Nowadays Fairy Book' (1911); 'The Street-Car Mystery' (1911); 'The Spirit of the Sea' (1912); 'The Eagle's Mate' (1914); 'The Every Day Fairy Book' (1915) and contributions to magazines and to the Sunday editions of the New York *Times* and *Herald.*

CHAPIN, Edwin Hubbell, American clergyman: b. Union Village, N. Y., 29 Dec. 1814; d. New York, 27 Dec. 1880. In 1837 he was ordained to the Universalist ministry, was a pastor at Richmond, Va., Charlestown and Boston, Mass., 1838–48, and then accepted a call to the Fourth Universalist Church in New York, a connection he retained until his death. He became editor of *The Christian Leader* in 1872, succeeding Dr. Emerson. His collected sermons and addresses are 'Duties of Young Men' (1840, 9th ed., 1856); 'Duties of Young Women' (8th ed., 1856); 'Characters in the Gospels' (1852); 'Discourses on the Lord's Prayer' (1850); 'The Crown of Thorns' (1860); 'True Manliness' (1854); 'Moral Aspects of City Life' (1853); 'Discourses on the Beatitudes' (1855); 'Select Sermons' (1860); 'Living Words' (1861); 'Lessons of Faith and Life' (1876); 'God's Requirements' (1881); 'The Church of the Living God, and Other Sermons' (1881). Consult Ellis, 'Life of E. H. Chapin' (1883).

CHAPIN, Henry Edgerton, American biologist: b. Wilbraham, Mass., 9 May 1859. He was educated at the Massachusetts Agricultural College and at Boston University. In 1886–87 he took a post-graduate course in chemistry and biology at Johns Hopkins University. He taught in secondary schools and engaged in agricultural journalism in 1881–86, taught at the Pennsylvania State Normal School in 1888–90 and from 1891 to 1900 was professor of biology at Ohio University. Since 1900 he has been instructor in biology and physiography in a New York high school. He is joint author of Chapin's and Rettger's 'Elementary Zoology and Guide' (1896) and has written many scientific monographs.

CHAPLAIN, a clergyman not having a parish or similar charge, but connected with a court, the household of a nobleman, an army, a prison, a ship or the like. Army chaplains in the United States are appointed by the President and are assigned or transferred by the Secretary of War. They are usually attached to the various army posts. By acts of Congress, approved 1901, 1904, 1906 and 25 Jan. 1907, provision is made for 67 army chaplains, 15 of whom may be majors; those of less than seven years' service, first lieutenants; and the remainder captains. They are required to make a monthly report to the adjutant-general of the duties performed, and to keep a record of all marriage, funeral or baptismal services performed by them. Another duty is the instruction of the enlisted men in the common English branches of education. Chaplains are chosen from all religious denominations and must be under the age of 40 at time of appointment. There are 24 chaplains in the United States navy; 4 with the rank of captain, 7 of commander, 5 of lieutenant-commander, 1 lieutenant and 7 lieutenants (junior grade). Their duties, responsibilities and remuneration in general correspond with the relative army rank.

CHAPLAIN OF THE FLEET, The, a novel by Walter Besant and James Rice, published in 1881. It gives a detailed account of the famous Liberties or Rules of the old Fleet prison in London, and of the Fleet marriages of the 18th century. These «Rules» were houses in certain streets near the Fleet Market, where prisoners for debt were allowed to live, outside the prison, on payment of fees. This novel is considered one of the best of those written under the firm-name of Besant & Rice.

CHAPLEAU, shā-plō, Sir **Joseph Adolphe,** Canadian statesman: b. Sainte Thérése de Blainville, Quebec, 9 Nov. 1840; d. Montreal, 13 June 1898. He was educated at the colleges of Terrebonne and Saint Hyacinthe, and in 1861 became a member of the bar. He represented Terrebonne in the Quebec legislature, served successively in the capacities of Solicitor-General, Provincial Secretary, Provincial Premier, Minister of Agriculture and Public Works in the government of Quebec, and was finally appointed Secretary of State for the Dominion in 1883. He was lieutenant-governor of Quebec in 1893–98, and for some years was professor of international law at Laval University.

CHAPLIN, Charles, moving picture actor: b. France, 16 April 1889. His parents were English music hall artistes touring continental Europe at the time of his birth. Chaplin adopted a variety-stage career in his early youth and traveled for some years through the English provinces, performing in pantomime and displaying a marked talent for humorous acrobatic «stunts.» Another accomplishment credited to him is that of playing the violin and 'cello — left-handed. He eventually joined the Fred Karno Company, an old English troupe performing ludicrous sketches in which pantomime, burlesque and knock-about acts were hilariously blended. With this company he

came to New York in 1911, playing a part in a sketch entitled, «A Night in a London Music Hall.» Chaplin's distinctive style of acrobatic humor led to his being engaged by Mr. George Kessel to play in moving picture productions. With the enormous development and growth of this popular form of entertainment, Chaplin became a world-wide celebrity and one of the highest paid actors in the profession.

CHAPLIN, shăp-lăn, **Charles Joshua,** French portrait painter: b. Les Andelys, 6 June 1825; d. Paris, 30 Jan. 1891. He was of English parentage, but was naturalized as a French citizen. Under Napoleon III he was engaged in decorating the Tuileries and the Elysée, and he also painted many ceilings and wall decorations in Parisian public and private buildings as well as various portraits, mainly those of women. Among his best pictures are 'Souvenirs,' in the Luxembourg and 'Haidee,' in the Metropolitan Museum, New York.

CHAPMAN, Alvan Wentworth, American botanist: b. Southampton, Mass., 28 Sept. 1809; d. 6 April 1899. He graduated at Amherst 1830, studied medicine in Georgia and Florida and in 1846 settled in Appalachicola, where he was collector of internal revenue 1865–66, and collector of customs 1866–69. He attained a high rank as a botanist, and the genus *Chapmannia* was named in his honor. He wrote 'Flora of the Southern United States, Arranged According to the Natural System; the Ferns by D. C. Eaton' (1860, 2d ed. enlarged, 1883; 3d ed., 1897).

CHAPMAN, Carlton Theodore, American artist: b. New London, Ohio, 18 Sept. 1860. He was educated at Oberlin, Ohio, and received his artistic education at the National Academy of Design and the Art Students' League, New York and at the Julien Academy, Paris. He has made a specialty of marines and landscapes, and is famed for his representation of the naval battles of the United States. His latest works include 'The Derelict'; 'The U. S. S. Gloucester and the Spanish Torpedo Boats'; 'A Squally Day—North River'; 'Off Ellis Island'; 'The Argus and the Pelican'; 'The Bonhomme Richard and the Serapis'; 'The Lighthouse'; 'O'er the Dark Sea'; 'The Pacific Coast'; 'The Mystic Pool'; 'Battle of Cape St. Vincent.' He is a member of the National Academy of Design and was awarded medals at all recent expositions.

CHAPMAN, Frank Michler, American naturalist: b. Englewood, N. J., 12 June 1864. Since 1887 he has been assistant curator in the department of vertebrate zoology in the American Museum of Natural History, New York. He made some excellent close-range photographic studies of bird life. He is editor of *Bird-Lore* and associate editor of *The Auk*. Besides many papers in scientific journals, etc., he has published 'Hand-book of Birds of Eastern North America' (1895); 'Bird-Life, a Guide to the Study of Our Common Birds' (1897); 'Bird Studies with a Camera' (1900); 'A Color Key to North American Birds' (1903); 'The Economic Value of Birds to the State' (1903); 'The Warblers of North America' (1907); 'Camps and Cruises of an Ornithologist' (1908).

CHAPMAN, George, English poet, the earliest and perhaps the best translator of Homer: b. about 1559; d. London, 12 May 1634. He is supposed to have been educated at Oxford 1576, proceeded to London, where he made the friendship of Shakespeare, Spenser, Marlowe and other distinguished writers of the time. As to his personal history little is known, but he is supposed to have held some post in connection with the court. The first of his works, so far as known, was the 'Shadow of Night,' a poem published in 1594. His translation of the 'Iliad,' in rhyming lines of 14 syllables each, was published in three separate portions, in 1598, 1600 and 1603. It has been highly commended by such poets as Pope, Keats and Coleridge, as also by Lamb. Keats' sonnet 'On First Looking Into Chapman's Homer' («Then felt I like some watcher of the skies,» etc.) is well known. In 1614 appeared his translation of the 'Odyssey' in the same metre as the 'Iliad,' followed in the same year by that of the 'Battle of the Frogs and Mice' and the Homeric hymns. He also translated Hesiod's 'Works and Days' and portions of various classic poets. He wrote numerous plays, almost all now forgotten, though containing some fine passages. The earliest of these was 'The Blind Beggar of Alexandria,' a comedy, 1598. He was associated with Jonson and Marston in writing the comedy of 'Eastward Ho!' which from its satirical reflections on the Scotch is said to have nearly brought severe punishment on the authors. Among his tragedies are 'Bussy d'Ambois'; 'Cæsar and Pompey'; 'Revenge for Honor'; and two dramas on the life of Marshal Biron, which Swinburne characterizes as «a storehouse of lofty thought and splendid verse, with scarcely a flash or sparkle of dramatic action.» An edition of his works was published (1873–74). Consult Swinburne, 'George Chapman: a Critical Essay' (1875); Arnold, Matthew, 'On Translating Homer.'

CHAPMAN, J. Wilbur, American clergyman, evangelist and author: b. Richmond, Ind., 17 June 1859. He studied for a time at Oberlin College and was graduated 1879 at Lake Forest University. He was educated in theology at Lane Seminary, Cincinnati, Ohio. The degree of D.D. was conferred upon him by the University of Wooster. The degree of LL.D. was conferred upon him by Heidelberg University, Otterbein, Ohio. He has filled pastorates in Indiana, Ohio and New York. His special ministry was in the First Reformed Church in Albany, N. Y.; the Bethany Presbyterian Church, Philadelphia, and the Fourth Presbyterian Church, New York city. Much of his ministry has been along evangelistic lines. He was an intimate associate of D. L. Moody, a noted evangelist. For 10 years he was the corresponding secretary of the General Assembly's committee on evangelistic work in connection with the Presbyterian Church. He is the representative at large of this committee at the present time. For 10 years he has given his time to evangelistic work. In addition to the larger cities in the United States, he has labored in Canada, Hawaii, the Fiji Islands, Australia, Tasmania, New Zealand, the Philippines, China, Korea, Japan, Ceylon, England, Ireland, Scotland and Wales. He is the

author of 'Receive ye the Holy Ghost'; 'And Peter'; 'Kadesh Barnea'; 'The Lost Crown'; 'The Secret of a Happy Day' (1899); 'The Surrendered Life' (1899); 'Spiritual Life in the Sunday School'; 'From Life to Life'; 'Present Day Parables'; 'Life of D. L. Moody' (1900); 'Present Day Evangelism' (1903); 'The Problem of the World' (1911); 'Chapman's Pocket Sermons' (1911); 'Revival Sermons' (1911); 'Present Day Evangelization' (1912).

CHAPMAN, John Jay, American lawyer and essayist: b. New York 1862. He was graduated from Harvard in 1884, was admitted to the New York bar and was in active practice there until 1898. His essays and speeches have attracted considerable attention on account of their striking individuality and original point of view. His published volumes include 'Emerson, and Other Essays' (1898); 'Causes and Consequences' (1898); 'Practical Agitation' (1900); 'Four Plays for Children' (1908); 'The Maid's Forgiveness' (1908); 'A Sausage from Bologna,' a comedy in verse (1909); 'Benedict Arnold,' tragedy in verse (1911); 'Learning and Other Essays' (1911); 'Neptune's Isle' (1912); 'William Lloyd Garrison' (1913).

CHAPMAN, Maria Weston, American reformer: b. Weymouth, Mass., 1806; d. there 1885. She was a daughter of Warren Weston, and received her education in her native place and also in England. In 1829–30 she was principal of the Young Ladies' High School, Boston. She married in 1830; became an active opponent of slavery in 1834; and after the death of her husband in 1842, went to Paris, France, and assisted the anti-slavery cause with her pen. She returned to America in 1856. She edited the autobiography of her friend, Harriet Martineau (1877); wrote 'Right and Wrong in Boston; Report of the Boston Female Anti-Slavery Society' (1836); 'Right and Wrong in Massachusetts' (1840). She compiled the anti-slavery hymnbook 'The Songs of the Free' (1836).

CHAPMAN, William, Canadian poet: b. Saint François de la Beauce, Quebec, 1850. He was educated at Levis College, studied law and for a time engaged in trade. Later he entered the civil service of his native province. He also did some journalistic work in Montreal and Quebec and in 1902 became a French translator for the Dominion Senate at Ottawa. He has written 'Les Quebecquoise' (1876); 'Le laureat' (1894); 'Les deux Copains' (1894); 'Les aspirations' (1904), which received a prize from the French Academy; and 'Les Royons du Nord' (1910), which gained the highest prize from the French Academy.

CHAPMAN'S HOMER. George Chapman (1559–1634), writer of plays and contemporary of Spenser, Marlowe, Jonson and Shakespeare, was a great translator in the great age of translations that brought forth the English Bible and so many versions and adaptations of the ancient classics. He published seven books of the 'Iliad' in 1598, and by 1616 had published together the 'Iliad' and the 'Odyssey' complete in rhymed 14 syllable verse. The literature of his own time contains much complimentary allusion to him, and the esteem of later generations is manifest in many glowing tributes from eminent literary characters, probably the most familiar and the most stimulating being Keats's sonnet, "Much have I travelled in the realms of gold:"

> "Oft of one wide expanse had I been told
> That deep-browed Homer ruled as his demesne;
> Yet did I never breathe its pure serene
> Till I heard Chapman speak out loud and bold . . . . ."

The "loud and bold" of Keats contains or suggests the qualities that have made Chapman's translation live in spite of the lack of polish, of exactness, and sometimes of dignity, that are charged against it. Pope, his later rival, says "he covers his defects by a daring fiery spirit that animates his translation." Even Matthew Arnold, the severe critic of all translations of Homer, who declares that "in a verse translation no original work is any longer recognizable," characterizes Chapman as "plain spoken, fresh, vigorous, and, to a certain degree, rapid." Arnold, however, condemns him on the whole. "Homer," he says, "is rapid in his movement, Homer is plain in his words and style, Homer is simple in his ideas, Homer is noble in his manner. . . . Chapman renders him ill because he is fantastic in his ideas. . . . His conceits are un-Homeric, and his rhyme is un-Homeric; his manner and movement are un-Homeric; his diction . . . often offends . . . by wanting Homeric nobleness." He condemns him most of all because "he cannot forbear to interpose a play of thought between his object and its expression. Chapman translates his object into Elizabethan, as Pope translates it into the Augustan of Queen Anne; both convey it to us through a medium." "For the Elizabethan age," write Butcher and Lang in the preface to their translation of the Odyssey, "Chapman supplied what was then necessary, and the mannerisms that were then deemed of the essence of poetry, namely, daring and luxurious conceits. . . . Without Chapman's conceits, Homer's poems would hardly have been what the Elizabethans took for poetry; without Pope's smoothness, and Pope's points, the Iliad and the Odyssey would have seemed tame, rude, and harsh in the age of Anne." If, as Arnold reasonably insists, the real test of successful translation is the attempt to satisfy *the scholar who has also poetical feeling,* Chapman must be said to please most those not perfectly possessed of the means of really judging him as a translator, but who come to his work more or less as to an original poem in the Elizabethan manner. Such readers will find him admirable for what R. H. Horne calls "his commanding energies, fulness of faith in his author's genius, and in his own inspired sympathies, his primitive power, and rough truthfulness of description"; and will feel not only the inspiration of the Homeric narrative but the inspiration of the translator himself.

GRANT SHOWERMAN.

CHAPPE, shāp, **Claude,** French abbé and inventor: b. Brûlon (Sarthe) 1763; d. Brûlon, 23 Jan. 1805. Having invented an ingenious system of signals to communicate at a distance with his friends, he presented it to the French Legislative Assembly in 1792. It was successfully tried between Paris and Lille, on a length of 48 leagues, and was adopted by the government. Chappe established several lines in France, and the one running north was first put in motion

to announce the recapture of the town of Condé from the Prussians. The inventor was at once rewarded by the convention, which, by a decree, appointed him *ingénieur télégraphe*. The lines were extended all over France, and the system was also adopted, with some alterations, through Germany and England. The attacks to which he was subjected, by persons jealous of his invention, preyed so much upon his mind that he committed suicide. His semaphore consisted of an upright post, with a transverse bar at top, and with two smaller arms movable on pivots. The position of the bars represented letters or words, and the posts were placed within visible distance one of another. Messages were conveyed a distance of 150 miles in 15 minutes by this method. Consult 'Histoire de la télégraphie' (1824) by Ignace Urbain Jean Chappe, brother of Claude Chappe.

CHAPPE D'AUTEROCHE, dō-tē-rōsh', **Jean,** French astronomer: b. Mauriac, Auvergne, 2 March 1722; d. San Lucas, Cal., 1 Aug. 1769. He was a priest, but giving his whole attention to astronomy, became one of the assistants of Cassini in delineating the general map of France, and edited the astronomical tables of Halley. In 1760 he was designated by the Academy to make an observation of the transit of Venus over the sun's disc, which Halley announced would happen 6 June 1761. He consequently set out for Tobolsk, in Siberia, which was pointed out as the most favorable point of observation. His mission was successfully accomplished; and returning to France at the end of two years, he published in 1768 his 'Voyage en Sibérie.' The following year he sailed for California to observe another transit of Venus, which was to take place 3 June. He was equally successful on this occasion, but died soon afterward. The results of his last expedition were published by Cassini, under the title of 'Voyage de la Californie' (Paris 1772).

CHAPPED HANDS, a form of eczema (*eczema fissum*), caused by exposure to extremes of cold and heat. The skin swells and cracks and there is itching, pain and heat and in severe cases ulceration. The lesions are generally treated with oxide of zinc ointment, or a solution of borax in glycerin and rose water or with glycerin alone. The hands should be protected by warm gloves. Chapping may be avoided to a great extent by washing the hands with a bland soap in tepid water and thoroughly drying them afterward.

CHAPPELL, William, English musical antiquary: b. 20 Nov. 1809; d. London, 20 Aug. 1888. For the most of his life he lived in London, where he was for some years a member of a great music publishing house. His first work of importance was 'A Collection of National English Airs, Consisting of Ancient Song, Ballad and Dance Tunes' (1838-40). He took a principal part in the foundation in 1840 of the Percy Society and the Musical Antiquarian Society and published the first volume of a 'History of Music' in 1874.

CHAPPLE, Joe Mitchell, American journalist: b. La Porte City, Iowa, 18 July 1867. He studied at Cornell College, Iowa, and was engaged in journalism in Dakota, Ashland, Wis., and Chicago until 1897, when he became editor and publisher of *The Bostonian,* afterward changed to *The National Magazine,* Boston, Mass. He has written three novels 'The Minor Chord' (1895; new ed., 1898); 'Boss Bart, Politician' (1896); and 'The Heart Chord' (1916); also 'Mark Hanna' (1903); 'Heart Throbs' (1906); 'The Panama Canal' (1907); 'The Happy Habit' (1908); 'Heart Songs' (1909); 'Little Helps' (1910); 'History Making' (1911); 'Heart Letters' (1912). He has wide reputation as a speaker, having visited every State in the Union in his lecture tours. 'Flashlights of Famous Men' is his most popular lecture.

CHAPTAL, shäp-täl, **Jean Antoine Claude,** COMTE DE CHANTELOUP, French chemist and statesman: b. Nogaret, Lozère, 4 June 1756; d. Paris, 30 July 1832. During his medical studies and practice he devoted much research to the science of chemistry, in which he soon became eminent, and was appointed professor at Montpellier, where he taught successfully the doctrines of Black, Lavoisier and Cavendish. He established chemical works near Montpellier, the first attempted of the kind, by which he was soon enabled to produce various chemicals hitherto imported, such as the mineral acids, alum, soda and salts of lead. The authorities of Languedoc heaped honors on him; the Spanish government offered him a pension of 56,000 francs to go to Spain, and according to his biographer, Washington wrote three times to Chaptal, inviting him to America. After the outbreak of the French Revolution he published a political pamphlet, entitled 'Dialogue Between a Montagnard and a Girondist,' and was arrested, but through the intercession of friends was liberated. The Committee of Public Safety placed him in charge of the powder mills of Grenelle, now a part of Paris, which produced, under his management, 3,500 pounds of gunpowder daily. Once more returning to Montpellier, he was elected member of the Institute, and devoted himself to science, until Bonaparte summoned him to the council of state, where he had the supervision of national education. When Lucien Bonaparte resigned the portfolio of the interior, Chaptal took his place as minister, and for four years performed the duties of the department with much administrative ability. He founded the conservatory, school of arts, chambers of commerce and society for encouragement of industry, introduced the modern French system of weights and measures, established a model farm and a system of distribution of agricultural seeds, reorganized the prisons and hospitals, extended the network of highways over the face of the country and organized the carrying out of the plans of extension of the Louvre and rues de Rivoli and Castiglione, since completed by Napoleon III. On Napoleon's return from Elba, the Count was appointed director-general of commerce and manufactures and Minister of State. Louis XVIII struck him from the list of peers, but left him on the roll of the Academy. His works are all on chemical subjects, and may yet be consulted with advantage.

CHAPTER (Latin *caput,* head), one of the chief divisions of a book. As the rules and statutes of ecclesiastical establishments were arranged in chapters, so also the assembly of

the members of a religious order, and of canons, was called a chapter, because some or all of the chapters containing the rules were read there; and the place where they assembled, as well as the reproof administered to a delinquent member, by reading the rules of the chapter transgressed, had the same name. The orders of knights, which originally had much of the ecclesiastical constitution, used this expression for the meetings of their members, and even some corporations of mechanics or tradesmen call their assemblies chapters. In England, as elsewhere, the deans and chapters had the right to choose the bishop, but Henry VIII assumed this right as a prerogative of the Crown.

CHAPTER-HOUSE, a building attached to a cathedral, collegiate church or church belonging to a religious house in which the chapter meets for the transaction of business. Chapter-houses are of different forms, being sometimes regular polygons of 4, 8 or 10 sides, and in other cases circles or parallelograms; and their architecture is often noteworthy. Sometimes they were the burying-places of clerical dignitaries. Among the most notable of English chapter-houses are those at Lincoln Cathedral (which is decagonal, with a central column), Salisbury, Wells, Southwell and York, the two last named excelling all others in Great Britain in the beauty and richness of their carved stonework. There is a chapter-house at Bristol, of the Norman period, in shape a parallelogram, much enriched with arcading and various kinds of Norman ornament. The chapter-houses at Gloucester and Canterbury are likewise parallelograms, but of the Third Pointed or Perpendicular period.

CHAPULTEPEC, chä-pool'-tē-pĕk ("Grasshopper Hill"), **Battle of.** This, the last considerable engagement of the Mexican War, which was followed by the immediate occupation of the City of Mexico, was fought 12–13 Sept. 1847. Chapultepec is an isolated rocky mound 150 feet high, two miles southwest of the southwestern or Belen gate of the city, and guarding a main road into it; sharply precipitous on the northern, eastern and part of the southern sides, but on the west and southwest sloping gradually to level marshy ground partly covered with a cypress grove. Here Montezuma and his predecessors had their pleasure grounds, and Chapultepec was their country-seat A fortified castle was started here by the viceroy Galvez in 1785, but left unfinished; from 1822 it was used as a military academy, in 1847 having some 40 students, who fought heroically in the battle. It was guarded by strong batteries, and its approaches were protected by walls (an aqueduct on the north) which shielded other batteries; through the marshy fields in front of these were irrigating ditches, some large and deep, with high banks and sticky bottoms, very serious obstacles to troops and artillery. The one military defect of the castle for modern warfare was the limited force that could effectively use arms within it; the garrison of 800, commanded by Gen. D. Nicholas Bravo, was as large as could well operate there. Along its approaches were some 4,000 to 4,500 more troops, while Scott had 7,500; but Santa Anna dared not strip the other entrances to the city. By the battle of Molino del Rey (q.v.) on the 8th Scott had carried a set of long stone buildings southwest of Chapultepec and, though under its guns, forming some protection for hostile artillery. On the 12th Captain Huger planted heavy batteries there and at three other places, to range the south and west of the hill, the only accessible portions, on which an assault had been determined; and their fire gradually silenced that from Chapultepec, breached the defenses and caused much loss. About 8 A.M. on the 13th Scott launched two assaulting columns: Pillow on the west, from Molino del Rey through the cypress grove, supported by Worth; Quitman against the south, from the heights of Tacubaya, where Scott had his headquarters, supported by Persifor F. Smith's brigade. Preceded by the pioneer companies with ladders, axes, picks and crowbars, and under a plunging fire, they surmounted all obstacles, cleared the approaches, broke through the walls, climbed the heights, entered the castle gates and having cut off retreat by the northwestern road to Mexico, captured the entire garrison. The approaches and castle had been mined, but the defenders waited too long before exploding the mines, and failed. The next day the American army overcame all remaining resistance and entered the capital. Their loss in these three days was 863 killed and wounded, included Col. T. B. Ransom killed, Pillow and Shields wounded. The Mexican loss was unknown, but certainly as heavy, and included several gallant and brilliant officers; and 823 prisoners were taken, including three generals, one the commandant of the academy. Among the American officers prominently engaged were a remarkable number afterward distinguished in military and civil life: Robert E. Lee, Joseph E. Johnston, James Longstreet, "Stonewall" Jackson, David E. Twiggs, Gideon J. Pillow, D. H. Hill, J. B Magruder, Barnard E. Bee, P. G. T. Beauregard, Geo. E. Pickett, Raphael Semmes; George B. McClellan, Silas Casey, E. V. Sumner, Jesse L. Reno, James Shields, I. I. Stevens, Z. B. Tower, William S. Harney; Thomas H. Seymour, John W. Geary, Mayne Reid. Franklin Pierce had been severely wounded at Molino del Rey. Consult Wilcox, C. M., 'History of the Mexican War' (Washington 1892); Bancroft, H. H., 'History of Mexico, Vol. V' (San Francisco 1885).

CHAR, chär, a genus of fishes (*Salvelinus alpinus*) of the family *Salmonidæ*. They were formerly classified in the same genus as the trout (*Salmo*), from which they are, however, differentiated by color, by smaller scales, by the structure of the vomer and by its red, instead of black, spots during the breeding season. There are several varieties of this fish, all having intense and beautiful colors; length from 10 to 15 inches; weight sometimes as high as two pounds, but generally ranging under one pound. All kinds are held in esteem for the table. They are found plentifully in the deeper lakes of England, Wales, Ireland and more rarely in Scotland, also in the Lake of Constance and Lake Geneva. The best known American variety is the brook-trout, *S. fontinalis;* there is also a variety found in Maine, known as the Rangeley Lake trout, which is very similar to the European char.

CHARA, kā'ra, in botany, a genus of plants, the typical one of the family *Characeæ*. The species are found in ponds. In palæontology, the nucules, known under the name of *Gyrogonites*, are found for the first time in the freshwater beds of the Jurassic (Oölitic) formations. They are the minute spiral fruiting bodies of sporocarps of these plants.

CHARACEÆ, kā-rā'sę-ē, a family of cryptogamous plants, related to the *Algæ*, composed of an axis consisting of parallel tubes, from which the branches are given off in whorls. The axes are either transparent or incrusted with calcium carbonate. The plants inhabit stagnant water, both fresh and salt, beneath which they are always submerged. They are found in almost every part of the world, but are most common in the temperate zones. Many species emit a disagreeable odor.

CHARACTER (from Gk. *χαρακτήρ* a mark). While it is doubtless true that the things which we primarily weigh and evaluate in our discussion of moral worths are actions, the actions of an individual do not form a haphazard aggregate of unrelated deeds. There is a certain continuity in a man's acts, whereby one who knows him is able to predict pretty much what he will do under given circumstances. This continuity is due to the fact that behind the shifting play of emotions that is to be found in the mental life of everyone, there is a background of permanent emotional associations and emotional processes which changes very slowly or not at all. This stable background of the moral life is the character. Though a single deed may arise from the impulse of a mere fleeting emotion, and so falsify predictions made on the basis of a knowledge of a man's character, in the long run there will be found a very intimate correlation between a man's character and his deeds. As a result, our evaluation of a man's deeds can be and is vicariously transferred to his character. It is on account of this transference that we are able to speak of a noble character, a base character, etc., meaning, the character of a man who is wont to perform noble deeds, or the character of a man who is wont to perform base deeds. All this permits us to assign a permanent moral worth to individuals, and this assignment is of the utmost social value, inasmuch as it points out who is of lasting detriment to society and needs suppression, who is of lasting benefit and needs encouragement. Consult Jastrow, J., 'Character and Temperament' (New York 1915); Shand, A. F., 'The Foundations of Character' (London 1914); White, W. A., 'Mechanisms of Character Formation' (New York 1916).

CHARACTERISTIC (from Gk. *χαρακτηριστικός*). This term is used in many senses in mathematics. The characteristic of a common logarithm (q.v.) is its integral part, which is so chosen that the fractional part is never negative. It depends only on the positive or negative power of 10 next smaller than the number whose logarithm is taken, and can consequently be found by inspection, so that it is not usually given in tables of logarithms. The fractional part of a logarithm is called the *mantissa*, and is not altered if the number whose logarithm is to be found is multiplied or divided by a power of 10. Thus 35, 78 and 91 all have the characteristic 1. .002, .0018 and .00948 have the characteristic -3. On the other hand, 7,000,000, 7, and .000,007 all have the mantissa .845,098,0....

The phrase, «characteristic of a family of surnames,» is used by Monge of a certain set of lines dependent on the family. Let us have given a one-parameter set of surfaces, $F(x, y, z, a) = 0$, where a is the parameter. Consider two surfaces of the family. In general, these will intersect in a line, whose value depends on the two values of a chosen. Consider the limiting position of this line as one value of a approaches the other. That is, consider a curve which satisfies the simultaneous equations $F = 0$ and $\frac{\delta F}{\delta a} = 0$. This is called a *characteristic* of the family of surfaces. The locus of all the characteristics of a family of surfaces is its envelope.

In the phraseology of the 18th century, the characteristic triangle of a curve at a point is the triangle bounded by the tangent and abscissa at that point and a neighboring ordinate.

The word is also used to denote certain arithmetical invariants in the theory of algebraic forms, the cross-ratio of the four tangents which can be drawn to a plane cubic from a point itself situated on the cubic, and many things besides. It is a custom among mathematicians who arrive at a new idea to call it by a name familiar in other branches of the science, and so there is scarcely a department of mathematics which does not involve some concept known by the name «characteristic.»

CHARACTERISTICS. Shaftesbury's 'Characteristics' consisting of six treatises collected and published in 1711: 'A Letter Concerning Enthusiasm'; 'An Essay On The Freedom Of Wit And Humor'; 'Advice To An Author'; 'An Inquiry Concerning Virtue Or Merit'; 'The Moralists'; and 'Miscellaneous Reflections.' The book is the principal life work of a cultivated and high-minded Whig nobleman who, debarred by ill health from a public career, dedicated himself to the study, practice and inculcation of moral philosophy. Writing for a sceptical and rationalizing age, Shaftesbury is primarily concerned to show that goodness and beauty are not determined by revelation, authority, opinion or fashion, but by the essentially constant and inalterable nature of man and things. From his 'Philosophical Regimen,' first published in 1900, it appears that he had reached his own convictions by a rigorous process of self-examination and self-discipline in imitation of his favorite classical masters, Epictetus and Marcus Aurelius. In common with the Stoics of antiquity and the Deists of his own time, he finds in the general harmony of the universe objective evidence of a supremely benevolent Mind, to whose purposes it is the part of every man's wisdom to conform. In distinction from Hobbes, he holds that human society was not created by a contract but was inherent, from the first appearance of man in the world, in the natural and necessary relationships of male and female, parents and offspring. In distinction from Locke, the supervisor of his early education, he denies that all our ideas are derived from experience, in-

sisting that our conceptions of right and wrong are, if not precisely innate, yet predetermined and appointed for us by our physical and mental constitutions and by our destiny as social beings. To study the "natural" law of one's own being and of one's relationship to one's fellow beings and to the universe is essential, Shaftesbury persuades us, to the character of a fine gentleman and a man of sense. "To philosophize, in a just signification, is but to carry good-breeding a step higher. For the accomplishment of breeding is to learn whatever is decent in company or beautiful in arts; and the sum of philosophy is, to learn what is just in society and beautiful in Nature and the order of the world." This passage suggests what is perhaps the most personal aspect of Shaftesbury as a moralist, namely, his æsthetic sensibility, his identification of the good with the beautiful, his insistence that conduct is a fine art with principles analogous to those of music and sculpture, and to be relished by every gentleman of taste. To a public beginning to take pride in its civility, in its tolerant and equable temper, in its devotion to common sense, Shaftesbury's studious ease and serenity appeared admirable, his urbanity worthy of emulation, his suave irony delicious and his benevolent and optimistic metaphysics an acceptable antidote to the egoism of Hobbes and the pessimism of the theologians. He attained in the 18th century a wide reputation in England and abroad, influencing such men as Leibnitz, Herder, Franklin, Voltaire, Diderot, Montesquieu, Pope, Hutcheson, Hume and Butler. In the reaction which followed the French Revolution his political and religious liberalism was disparaged as atheistical and revolutionary; whereupon it was discovered that his style was artificial and pedantic. Within recent years there have been some attempts at a critical restoration, notably in J. M. Robertson's edition of the 'Characteristics' (1900), and in Benjamin Rand's 'The Life, Unpublished Letters And Philosophical Regimen' (1900), where Shaftesbury is ranked with Epictetus and Marcus Aurelius as one of "the three great exponents of stoical philosophy." Consult also Hatch, incomplete edition of 'Characteristics' (1870); Gizycki, 'Die Philosophie Shaftesburys' (1876); Stephen, 'English Thought in The Eighteenth Century' (1876); Fowler, 'Shaftesbury and Hutcheson' (1882); Martineau's 'Types Of Ethical Theory' (1885); Hatch, I. C., 'Der Einfluss Shaftesburys auf Herder' (1901); Moore, C. A., 'Shaftesbury and the Ethical Poets in England' (in Pub. Mod. Lang. Assoc., 1916); Walzel, 'Shaftesbury und das deutsche Geitesleben des 18 Jahrhunderts' (1909).

STUART P. SHERMAN.

CHARACTERS (Caractères). The 'Characters' of Jean de la Bruyère are a collection of reflections on human nature and conduct and of "portraits" of different types of character or varieties of moral development, studied with patient and penetrating observation and drawn with extraordinary skill in a few precise, significant and revealing lines. They are distributed over 16 chapters: Works of the mind, personal merit, women, the heart, society and conversation, material possessions, the city, the court, persons in high station, the sovereign or the state, man, judgments, fashion, certain usages, the pulpit, the strong-minded. They derive in part from the 'Characters' of Theophrastus and appeared for the first time (1688) as an appendix to a translation that La Bruyère had made of that work, modestly hiding behind the Greek even in the title: 'The Characters of Theophrastus, translated from the Greek, together with the Characters or the Manners of this Century.' They also continue the "portraits" that had long been popular in the novels of the time and in the literary recreations of certain salons. But these portraits are no longer complimentary and flattering, as those had been. Instead they insist pitilessly on the unlovely realities of motive that too often lie behind the smiling mask of manners. La Bruyère was a sharp-eyed observer of the brilliant society of court and salon. Indeed, there were many complaints from those who saw themselves in the satiric pictures he drew, though he disclaimed the intention of painting particular persons. His view of human nature is less embittered than that of his great contemporary La Rochefoucauld, in the Maxims, but it is stern and hard, lacking in pity and tenderness. To the composition of his 'Characters' he brought a rare command of the French language, which he cultivated with infinite pains, and the judgment of M. Vallery Radot is often quoted with approval: "If you wish to take an inventory of the riches of our language, if you wish to know all its ins and outs, its movements, its figures, its resources, there is no need to have recourse to a hundred volumes; read, reread La Bruyère."

The 'Characters,' by the progress they mark in the art of psychological observation and moral characterization, also contributed substantially to the development of the novel, and their influence was clearly seen presently in England in Addison and Steele. Several translations were made, one by Nicholas Rowe (1709). None, however, is at present current. The standard edition is that of M. G. Servois, in the series of the 'Grands Écrivains de la France' (3 vols., Paris 1865–68).

ARTHUR G. CANFIELD.

CHARADE, shą-rād' (Fr.), a syllabic enigma, that is, an enigma the subject of which is a name or a word that is proposed for discovery from an enigmatical description of its several syllables taken separately, as so many individual words. A charade may be called complete if the different enigmas which it contains are brought into a proper relation to each other, and, as a whole, unite in an epigrammatic point. The French excel in this species of literary amusement, of which the following is a good example:

> Quatre membres font tout mon bien
> Mon dernier vaut mon tout.
> Et mon tout ne vaut rien.

The answer is "zero": "my last is worth my whole, and my whole is worth nothing." One from the German goes "In front and behind, round; in the middle just a pound." The answer is the name Otto, "tt" being the equivalent of "lb." a pound.

Acting Charades, a kind of entertainment made up of pantomime and dialogue, and im-

provised by the members of an evening party. The syllables and complete word are meant to be suggested by the various divisions of the piece. An example may suffice to convey the idea: Two of the parlor actors meet on the platform; they shake hands, one says "How do you do, Doctor?" They both pass off at once and leave the audience to guess the word, which is "metaphysician."

CHARADRIUS, kȧ-răd'rĭ-ŭs, the genus to which the plover belongs, forming the type of the family *Charadriidæ,* which includes also the lapwings, dotterels, oyster-catchers, turnstones, sanderlings, etc.

CHARALES, kȧ-rā'lēz (from Latin *chara,* some unknown plant), a highly specialized order of the green algæ or Chlorophycaceæ. By some authorities it is considered as a group — the Characeæ — of rank equal to that of the Chlorophycaceæ (q.v.). Members of the group are found both in fresh and in salt water. Formerly there were held to be only two genera of Charales, *Chara* and *Nitella,* but each of these has been subdivided by recent authorities. All the members of the group bear a strong superficial resemblance to the Archegoniate plants, for they appear to possess stem, leaves and roots. In fact, their general external aspect is that of a small *Equisetum.* They grow to a height of from three inches to three feet, but the stalk is exceedingly slender, rarely exceeding a fifteenth of an inch in thickness.

Although asexual reproduction by spores is unknown in the Charales, they have several different types of structures which are able to survive after being separated and which develop into new plants the spring after they leave the mother plant. Sexual reproduction is carried on through extremely complicated organs whose closest analogues elsewhere are to be found among the brown algæ. These organs, which are differentiated into male and female, are to be found at the points where the so-called leaves give off their leaflets. In certain species they are to be found on different plants, but usually the same node bears both the curiously twisted oogonia and the antheridia, as the female and male organs are respectively called. Of all male organs among plants, the antheridium of the Charales attains the highest degree of complexity.

The female cell or ovum is large and turbid with oil-drops and starch-grains, but the outer end is hyaline. The male cells or spermatozooids are of spiral form and taper, having two cilia at the smaller end. The product of the union of the spermatozooid and the ovum is the fertilized egg-cell or oospore. There is no alternation of generations with n chromosomes and 2n chromosomes to be found in any of the Charales. Nevertheless the oospore does not develop into the plant, but goes through the stage known as the proembryo. In *Chara crinita,* only the female of which is known, the ovum develops into an oospore parthenogenetically, and no chromosome-reduction takes place.

The precise affinities of the Charales are not well known. Their sexual organs are unlike those of the other green algæ, but closely resemble those of the brown algæ, but *Chara* does not contain a trace of the brown pigment of the latter. The position that has been assigned to them as precursors of the mosses is at least doubtful, although they show a close analogy to the Archegoniates in their karyokinetic processes and in the form of the antherozooids. Consult Allen, 'Characeæ of North America' (New York 1888); Filarsky, 'Die Characeen' (Budapest 1893).

CHARBON ROUGE, shär-bŏn roozh, or **RED COAL,** a kind of charcoal obtained by subjecting wood to the action of heated air from furnaces, or of steam raised to a temperature of 572° F. Air-dried wood, by the ordinary process, yields at most 21 to 26 per cent of black charcoal, while by the steam process 36 to 42 per cent of red charcoal is obtained. It is of a dark-red color and contains 75 per cent pure carbon and 25 per cent hydrogen and oxygen. It is used in the manufacture of gunpowder.

CHARCOAL, an impure variety of carbon, prepared from vegetable substances or bones. Wood charcoal consists of wood burned with but little access of air. Billets of wood are built into a heap, which is covered with earth or sand. The heap is fired at openings left near the bottom of the pile, and the gases escape at small openings above. For making fine charcoal, such as that of willow, used in the manufacture of gunpowder, the wood is burned in iron cylinders, or rather retorts, in which a process of destructive distillation removes the volatile hydrocarbons, pyroligneous acid, etc. By this more perfect means the process is accurately regulated. Charcoal is used in the arts as a fuel; as a polishing powder; a table on which pieces of metal are secured in position to be soldered by the blowpipe; a filter; a defecator and decolorizer of solutions and water; an absorbent of gases and aqueous vapors; a non-conducting packing in icehouses, safes and refrigerators; an ingredient in gunpowder and fireworks; and in the galvanic battery and the electric light.

Animal charcoal, used largely in sugar-refining and as a disinfectant and filtering medium, is prepared by calcining bones in closed vessels. These are either retorts, similar to those in which coal is distilled for the production of illuminating-gas, or they are earthenware pots, piled up in kilns and fired. Charges of 50 pounds of bones to a pot will require 16 hours of firing. The bones are then ground between fluted rollers, the dust removed and the granulated material used for charging the filters of the sugar-refiner. The material is used for removing color, feculences and fermenting ingredients from the syrup.

In medicine charcoal is sparingly used, but is of service in gastric indigestion in which there is much evolution of gas. Charcoal takes up the gas and therefore prevents distention and pain. It has no curative qualities and is solely alleviative. See LAMPBLACK.

CHARCOAL BLACK. See BLACKS.

CHARCOAL DRAWING. See ART DRAWING.

CHARCOT, shär-cō', **Jean Baptiste Etienne Auguste,** French explorer: b. Neuilly-sur-Seine 1867. He was an interne at the Hospital of Paris in 1890-94 and at the same

time an investigator at the Pasteur Institute. In 1896–98 he headed the clinic of the faculty of medicine at the University of Paris. In 1903–05 and again in 1908–10 he was leader of Antarctic exploration expeditions and afterward was made director of the Marine Laboratory of Higher Studies. He has published 'Arthropodes' (1907); 'Expédition antarctique française, 1903–05' (1908); 'Deuxième expédition antarctique française, 1908–10' (1911); '«Pourquoi Pas?» dans l'Antarctique' (1911).

CHARCOT, Jean Martin, French physician: b. Paris, 29 Nov. 1825; d. 16 Aug. 1893. His specialty was in the treatment of nervous and mental diseases, and he performed many curious and successful experiments in hypnotism and mental suggestion, in the Salpetrière, where he founded a clinic for the treatment of nervous diseases in 1880. He published several works treating of these subjects.

CHARD, the leaves of artichoke (*Cynara scolymus*) covered with straw in order to blanch them and make them less bitter. Beet chards are the leaf-stalks and midribs of a variety of white beet (*Beta cicla*), in which these parts are greatly developed, dressed for the table.

CHARDIN, shăr-dăn', **Jean Baptiste Siméon,** French painter, b. Paris 1699; d. 1779. His father was a carpenter. The young Chardin received his first instruction from Pierre Jacques Cazes and had practical experience in executing minor portions of pictures of fashionable painters. His first independent work was a sign for the office of a surgeon. In 1728 on the occasion of a religious procession, he exhibited in the open air two pictures, one of which, 'The Ray,' is now in the Louvre. He was already a master of still-life, the genre which was to be his principal occupation throughout his life. He was extremely conscientious, never beginning a new picture until the one preceding it was finished, and unceasingly consulting the object he was representing in order to be sure that his effect was true. Chardin was twice married, and the fact is not without importance when we consider the character of the man as reflected in his art. He was "good and modest" and the delightful glimpses of family life that he has noted in his pictures are surely a result of the conditions in his own home. Of his two children the son, Pierre, gave promise of becoming a painter of merit, but died prematurely at 37 years of age. Chardin was received as a member of the Académie de Peinture in 1728, and became its treasurer in 1755. In 1757 the King installed Chardin in an apartment in the Louvre where the painter spent the rest of his life. Diderot tells us that Chardin had a great understanding of art and could recognize it in others. The observation is certainly borne out by the fact that he was one of those who voted an encouragement to the young Louis David, who was to bring in a style of painting so different from his own. He was a wise teacher, Fragonard being a pupil of his before he went to study with Boucher, and it was to his first master that he owed the best of his instruction. While Chardin's picture like the exquisite 'Pourvoyeuse' or 'Le Bénédicité' at the Louvre and the innumerable still-life pieces might seem at first to suggest the Dutch school, he is in reality akin to the Hollanders only through the fortuitous similarity of his subjects. He is of the Latin tradition and his color and his idea of light — a matter to which he gave great attention — come from the earlier Frenchmen, with their Italian heritage. The composition of Chardin's work is also far removed from the Dutch — though one man of the latter nation must have appeared sympathetic to him, Vermeer of Delft. Even the latter, however, if he is easily Chardin's peer in the matter of light, is not to be placed beside him as a colorist. From the gentle palette, so gay and so harmonious, the best influence has gone forth to the French colorists ever since, and not even Delacroix can make us forget the indebtedness to Chardin of such painters as Cézanne, Renoir and Matisse. He was very happy in the portrayal of children, as in 'Boy Blowing Soap Bubbles' and 'Girl with Cherries,' 'The Diligent Mother' and 'The Amusements of Private Life.' The best known of his portraits are a pastel of himself, now in the Louvre, and the excellent likeness of Rameau d'Alembert and Sedaine. From 1765 to 1767 he painted a series of decorative panels for the castles of Choisy and Bellevue, of which the 'Attributes of the Sciences, Arts and Music' are now in the Louvre. Examples of his work are in the National Gallery, London ('La Fontaine' and 'Still Life'), at the Metropolitan Museum, New York ('Still Life'), and at other museums. The great treasury of it remains in the Louvre. Consult Edmond Pilou's 'Chardin' (Paris 1909).

CHARDIN, Sir John, French Oriental traveler: b. Paris, 26 Nov. 1643; d. London, 26 Jan. 1713. Before he had reached his 22d year his father, a jeweler, sent him to the East Indies in order to buy diamonds. Chardin lived six years in Ispahan, where he was less engaged in mercantile business than in profound studies and scientific researches, making use of his connections at court for collecting the most authentic information of the political and military state of Persia. He collected the most valuable materials relating to antiquities and history. In 1670 he returned to France, but again left France for Persia, in 1671, taking with him a considerable quantity of precious stones artistically set, exquisitely worked jewelry, etc. He spent 10 years partly in Persia and partly in India. In 1681 he arrived in London, when he received the honor of knighthood. He published the first volume of his 'Travels into Persia and the East Indies,' in London, in 1686. The other volumes were about to follow, when he was appointed Minister Plenipotentiary of the King of England to the States-General of Holland and agent of the English East India Company to the same. In 1711 two editions of his 'Travels' appeared. He soon after returned to England. The exactness and truth of his statements and the extent of his knowledge, have been confirmed by all succeeding travelers, and have been serviceable to Gibbon, Helvetius and Montesquieu. The best edition of Chardin's 'Travels' is that by Langlès in 10 volumes (Paris 1811).

CHARDIN, Ohio, town and county-seat of Geauga County, 30 miles northeast of Cleveland, on the Baltimore and Ohio and the

Cleveland and Eastern Suburban railroads. It is an agricultural centre, has a large trade in dairy and maple products and contains a macaroni factory. The electric-lighting plant is municipally owned. Pop. 1,542.

CHARENTE, shā-rŏñt, France, an inland department, formed chiefly out of the ancient province of Angoumois and deriving its name from the river Charente, by which it is traversed; area, 1,487,447 acres; capital, Angoulême. It is in general uneven, with hills covered with chestnut-trees, sandy plains, meadows, etc. The principal rivers are the Charente, joined by the canal of Poitou with the Vienne, the Dronne, Tardoire, Bandiat, Touvre and Né. The wines of the department are of inferior quality and in little request for the table; but they yield the best brandy in Europe. The celebrated cognac brandy is made in the districts of Champagne, Cognac, Jarnac, Rouillac and Aigre from a grape called the *folle blanche,* which yields a white wine. The red wines furnish an inferior brandy, without the bouquet that distinguishes the genuine cognac. The wine-growers themselves carry on the distillation, each estate being furnished with stills and the necessary apparatus. Excepting brandy and paper, the manufactures of the department are inconsiderable, consisting of sacking, cloth, cordage, hats, corks, naval guns, leather, gunpowder, flour and earthenware. The paper made at Angoulême is said to be the best in France. The department is divided into the five arrondissements of Angoulême, Barbezieux, Cognac, Confolens and Ruffec. Consult Coquand, 'Description, physique, géologique, etc., du département de la Charente' (1859); and Lièvre, 'Exploration archéologique du département de la Charente' (1881). Pop. 346,424.

CHARENTE, a river in France, rising in the department of the Upper Vienne; flowing west and emptying into the Bay of Biscay, about 10 miles below Rochefort, opposite the Isle of Oleron; length, 225 miles. It gives its name to two departments, Charente (q.v.) and Charente-Inférieure (q.v.).

CHARENTE-INFERIEURE, ăñ-fā-rē-ėr, France, maritime department on the west coast, bounded on the north by the department of the Vendée, and on the south by Gironde; area, 2,792 square miles. It comprises parts of the former provinces of Angoumois, Saintonge and Poitou. The principal rivers that traverse or bound the department are the Charente, Gironde, Sendre, Boutonne and Sèvre-Niortaise — all of which are navigable, as well as the canal of Brouage and that between Niort and Rochelle. The soil is fertile and well cultivated; and a considerable portion planted with vines. The soil produces hemp, flax, saffron, oats, wheat, rye, potatoes and fruit. The pastures are good and well stocked with cattle, horses and sheep. Along the coast are extensive salt marshes. The industries include the manufacture of salt, brandy, machinery, porcelain and faience ware and oyster and pilchard fisheries. The chief harbors are those of Rochefort and La Rochelle; the latter town is the capital of the department. Pop. 450,871.

CHARENTON-LE-PONT, shā-rŏñ-tŏñ-lė-pŏñ, France, town situated about a mile to the southeast of Paris, with which it is connected by rail and tramway, at the confluence of the Marne with the Seine. It has numerous mercantile and manufacturing establishments, including boat building, piano making and porcelain and rubber goods. The stone 10-arched bridge across the Marne used to be considered as the key to Paris on this side; hence the memorable attacks upon it both in the civil wars of France and in those with foreign enemies. At Petit-Charenton is the celebrated asylum for the insane of both sexes. This establishment also contains a hospital for the care of accident victims in Paris, and a hospital for workingmen. From its connection with the asylum the town has given several significant popular phrases to the French language, equivalent to the use of Bedlam in English. A person of marked eccentricity is called a "Charenton boarder." Pop. 19,499.

CHARES, kā'rēz, the name of two well-known Greeks. The Athenian Chares was the general through whose incapacity the Thracian colony was lost to Athens during the Social War in 358–56 B.C., and who exposed his country to the designs of Persia, by entering for mercenary purposes the service of the revolted satrap, Artabazus. Although recalled in disgrace, Chares was sent in 349 to the aid of Olynthus, and again he returned without having achieved anything. In 340 he commanded the army sent to Byzantium against Philip, again gave evidence of his incompetency, was replaced by Phocion, but once more invested with the supreme command. In 338 the fatal issue of the battle of Chæronea seems to have been mainly due to his ignorance. He was noted for his athletic figure, his profligacy and his unscrupulous recklessness. Chares, the sculptor, a native of Lindus, Rhodes, flourished toward the close of the 3d century B.C. He was a pupil of Lysippus and the sculptor of the Colossus of Rhodes, one of the "seven wonders of the world," a representation of the Rhodian sun god erected in commemoration of the successful defense of Rhodes against Demetrius Poliorcetes in 303 B.C. See COLOSSUS.

CHARGE, *in heraldry,* one of the bearings. This may be one of the ordinaries, as they are called, the straight line bearings, as fess or chevron or a much more elaborate figure, as the representation of an animal or the head of one. Sometimes the charge is imposed upon another charge.

In gunnery, charge signifies the quantity of powder used at one discharge of a gun.

In military tactics, charge is the rapid advance of infantry or cavalry against an enemy, with the object of breaking his lines by the momentum of the attack. Infantry generally advances to about 100 yards and fires, then gradually quickens the pace into the charge-step, and dashes at the enemy's lines. Cavalry charges in echelon or column against infantry, which is usually formed in squares to receive the charge.

CHARGÉ D'AFFAIRES, shār-zhā dăf-fār', a representative of a country at a less important foreign court, inferior to an ambassador, a minister or resident minister, to whom is entrusted all matters of diplomacy. He is accredited not to the sovereign, but to the Minister for Foreign Affairs of a foreign power,

and holds his credentials only from the Minister for Foreign Affairs of his own country. The title is also given to the officer to whom the charge of an embassy is entrusted during the temporary absence of the ambassador or minister plenipotentiary. When there exist strained relations between two governments to the extent that formal diplomatic relations cannot be maintained, chargés d'affaires are often employed to exercise all the diplomatic functions of ministers.

CHARGE OF THE LIGHT BRIGADE, The, a remarkable military movement made by nearly 700 British soldiers at Balaclava, 25 Oct. 1854. At the attack on Balaclava the Russians had been forced back by the 93d Highlanders. Major-General Airy then sent down Captain Nolan, his aide-de-camp, with an order that the light brigade of cavalry, commanded by Lord Cardigan, was to charge along the southern line of heights and drive the Russians from the Turkish batteries. The order was not in itself difficult of interpretation; but Cardigan, to whom it was transmitted by Lord Lucan, his immediate superior, could see nothing from where he was stationed, and believed he was to advance down the valley in front of him. Lucan must have perceived the proper line of advance; but he did not inform Cardigan of his error, and Nolan was killed just as he perceived the wrong direction the brigade was taking and was endeavoring to set it right. Cardigan headed straight for the Russian guns, "into the jaws of death"; and the result was that the brigade of 673 mounted men was reduced in a few minutes to 195. "Some one had blundered." "It was magnificent, but it was not war." Lord Raglan, the British commander-in-chief, was wroth at this error and the grave losses sustained, and Lucan was recalled. On his return to England in January 1855 Cardigan was treated as a national hero and ever after he regarded himself as a man who had done great things. The poem under this title by Tennyson, written to the metre of Drayton's 'Battle of Agincourt,' was published in quarto in 1855, and another edition in octavo was published in the following year under the title 'In Honorem.' It is worthy of note that the line "Some one had blundered," deleted in the first edition, was restored in the second and succeeding editions.

CHARING CROSS, a triangular piece of roadway at Trafalgar square in the city of Westminster, forming the titular centre of London, so named from a cross which formerly stood at the village of Charing in memory of Eleanor, wife of Edward I. When the Queen's remains were brought in 1290 from Grantham to Westminster Abbey, the King accompanied the bier and erected at each stage where it rested a memorial cross. Of the 13 crosses raised, but two beside that in London remain. The original cross was demolished in 1647 by the Cromwellians as a symbol of Popish idolatry. The modern cross, erected in 1863, stands in the courtyard of the Southeastern and Chatham Railway, close by the site of the older one, of which it is as nearly as possible a reproduction, its style being the decorated Gothic of Edward's time.

CHARIOT, a vehicle used in ancient times either for pleasure or in war. According to the Greeks, it was invented by Minerva; while Virgil ascribes the honor to Erichthonius, a mythical king of Athens, who is said to have appeared at the Panathenaic festival, founded by him, in a car drawn by four horses. The ancient chariot had only two wheels, which revolved upon the axle, as in modern carriages. The pole was fixed at its lower extremity to the axle, and at the other end was attached to the yoke, either by a pin or by ropes. The Greeks and Romans seem never to have used more than one pole, but the Lydians had carriages with two or three. In general the chariot was drawn by two horses. Such was the Roman *biga,* but we also read of a *triga,* or three-horse chariot, and a *quadriga,* or four-horse one. In ancient warfare chariots were of great importance; thus we read of the 900 iron chariots of Sisera as giving him a great advantage against the Israelites. The Philistines in their war against Saul had 30,000 chariots. The sculptures of ancient Egypt show that chariots formed the strength of the Egyptian army. We have also numbers of sculptures which give a clear idea of the Assyrian chariots. These resembled the Egyptian in all essential features. In modern times the name chariot has been given to a kind of light traveling carriage now out of vogue. An Etruscan chariot, in part reconstructed, may be seen in the Metropolitan Museum, New York. Consult Daremberg and Saglio, 'Dictionnaire des antiquités'; Ginzrot, 'Die Wagen und Fahrwerke der Griechen und Römer' (1817); Helbig, 'Das Homerische Epos aus den Denkmälern erläutert' (1884); Leaf, 'Journal of Hellenic Studies' (Vol. V); also article "Currus" in Smith, W., 'Dictionary of Greek and Roman Antiquities' (3d ed., London 1890).

CHARITABLE TRUSTS or CHARITIES, any real or personal property gifted as a trust, which comes within an approved definition of a charity and which is for the benefit of an indefinite class of persons, sufficiently designated to indicate the intention of the donor, and constituting some portion or class of the public. Thus, a charitable trust or a charity is a donation in trust for promoting the welfare of mankind at large, or of a community, or of some class forming a part of it, indefinite as to numbers and individuals — in short, a gift for general public use. Most definitions attempt to carry the implication of public utility in its purpose as the following: A charitable trust is "a gift, to be applied consistently with existing laws, for the benefit of an indefinite number of persons, either by bringing their minds or their hearts under the influence of education or religion, by relieving their bodies from disease, suffering or constraint, by assisting them to establish themselves in life, or by erecting and maintaining public buildings or works, or otherwise lessening the burdens of government; a gift to a general public use, which extends to the poor as well as the rich." In charitable trusts the object is generally uncertain, because if described with definiteness it would cease to be a charity and would be governed by the ordinary rules of trusts.

While, generally speaking, charities are either public or private, it is only with what are known as public charities that the courts

concern themselves in applying the peculiar law relating to charities. The line of distinction which determines where a private charity ends and a public one begins is at times difficult to locate, and this difficulty has caused much of the apparent want of harmony which prevails among the decisions on this subject. Charitable trusts are not within the rule against perpetuities. In fact a charitable trust contemplates perpetuity as explained farther on. The general rule of law is that money or property devoted to a charitable use, where a trust is created, must, if the gift is accepted, be irrevocably devoted to such use.

Trusts for charitable uses are of ancient origin. In 1601 the English Parliament enacted the statute of 43 Elizabeth, which is frequently referred to as "The Statute of Charitable Uses," and that act has had an important bearing on the subject of public charities from that date until the present time. The statute was repealed in 1888, but the repealing act incorporated the preamble and it continues in force. Charitable trusts are recognized in all of the States of the Union, but a number of the States have never adopted the statute at all, their courts differing as to whether this statute is in force as a part of the common law. The statute is important by reason of its enumeration in its preamble of purposes and objects which are considered charitable, as the courts of practically all jurisdictions give consideration and weight to this enumeration, regardless of the foundation of the law of charities in the particular jurisdiction. Uncertainty of the object is one of the characteristics of a charitable trust, and it has led to what is known as the *cy près* doctrine, which is that the courts will interpret instruments creating charitable trusts so that if the exact object of the donor cannot be carried out the donation will be applied to something of a nature similar to that specified by the donor.

When a testator leaves property to his executors in such a manner that they are to be the sole judges of its use, and the executors die before the testator, it is doubtful whether the trust will come into existence, as the executors were the only persons who could designate for what the donation was to be applied. In some jurisdictions the rule is that if the property can be applied to other than charitable purposes it is too indefinite.

In cases in which the particular charitable purpose does not exhaust the whole fund, if from the instrument creating the fund, the intention appears that the entire amount is for charity, the surplus will be devoted to some other charity and will not form a resulting trust for the heir or next of kin. A gift may be made to a charity not in existence, and a gift to a specific charity will not fail for want of a trustee.

After the trustee has come into existence, if the purpose for which the trust was created fails for any reason, it will be applied to some other purpose of a similar character, so as to fulfil as nearly as possible the purpose for which it was intended. (See RHODES SCHOLARSHIPS).

Charitable trusts are not subject to the rule against perpetuities, which is that property cannot be tied up for more than a life or lives in being and 21 years thereafter. If property left to a charitable trust is limited upon another estate not a charitable trust, and the first estate is in violation of the rule against perpetuities, the trust will not be sustained; but after the trust once comes into existence the rule against perpetuities is not applied to it.

By English law all bequests for charitable purposes, to be valid, must be strictly for the public benefit; that is to say, in favor of institutions for the advancement of learning, science and art; for the support of the poor; or for other objects connected with the welfare of the public; and such bequests include those in favor of the Church or of other religious bodies sanctioned by the law. Bequests for what are classed as superstitious uses are null and void. A body of commissioners (the charity commissioners), under whose superintendency such benevolent trusts are placed, was established under the Charitable Trusts Acts of 1853, 1855, 1860, 1869 and 1888, and lastly upon the Mortmain and Charitable Uses Act of 1891. They have the power of inquiring into the administration of all English public charities. (See MORTMAIN; PENSIONS, OLD AGE; PENOLOGY; ENTAIL; TRUST; ROCKEFELLER FOUNDATION; RUSSELL SAGE FOUNDATION). Consult Tudor, 'Law of Charities and Mortmain' (London 1890); Perry, 'Treatise on the Law of Trusts and Trustees' (5th ed., Boston 1899), and Pomeroy, 'Treatise on Equity Jurisprudence' (3d ed., San Francisco 1905).

CHARITIES, Public, philanthropic associations and institutions of public and private initiative, for the relief of sufferers from disease, poverty and misery. Following in the footsteps of civilization a development of charity has come, often slowly and haltingly, but ever persistently, until the treatment of dependent poor is now accepted as evidence of the civilization of a community. A glance through history discloses not merely neglect of the defective mentally and physically, by savage and barbarous peoples, but an aggressively cruel policy to rid the community of the burden of their care. Crippled children were left to die and helpless old persons were put out of the way.

Under the Hebrews, however, charity became recognized as a duty incumbent on persons of wealth to provide for those in need, the motives being obedience to Divine Law and practical pity for the unfortunate. In Greece and in Rome, the "liberi" or free-born wealthy became patronizingly generous in liberal donations to the poorer classes. With the advent of the Christian Era charity in its broadest interpretation came to mean the exercise of humanity through the spiritual development of doing good, and the Church became a powerful organization in extending charity. Churches of all denominations have always looked after their poor and helpless; the Church is really the first organized charity. But the question arose as to whether, after all, it was not the duty of the community as a whole, rather than that of the Church, to care for the poor. It is well for the Church to do all that it can, but the fundamental responsibility for the care of the poor rests upon the community. Whatever the Church does lessens the burden upon

the state, but the conviction grew that the state is responsible and should be held responsible, and this may be said without in any degree lessening the responsibility that any church may feel for the care of its own. Like Hebrew charity, which has always been racial, churches are powerless to supply universal cooperation, because of their individual limitations, but they can assist and do assist in a general organization of charity. The proper sense of responsibility having at length developed, the dawn of the 20th century found a settled conviction in all civilized communities that it is as much the duty of the state to care for its dependents as it is to conserve the educational interests of its children. This change was wrought only by self-sacrificing devotion of charitably inclined students of sociology through centuries of unremitting labor. So slow, indeed, was the development of the practice of charity that it is well within the last hundred years that the care of the helpless was left to individuals or was treated by society at large as an unreasonable burden on the state. Even after the conviction became permanent that for its own protection, if for no higher reason, the state should assume the responsibility of caring for its helpless classes the conception of its duties were so vague and the method to be followed was so undefined, that the results were eminently unsatisfactory. Society regarded its dependents as being much on the same plane as its criminals and treated them much in the same way. Prisoners, dependent children, sick poor persons, the insane, the epileptics and the helpless aged were huddled together under one department of government and it was not infrequently the case that little or no discrimination was made in their care. General demoralization ensued and it became apparent that a remedy must be found if further progress was to be made in the development of the practice of charity. This remedy was found in segregation. It was clear that not only physical separation but governmental separation of the various classes was necessary. Custom and tradition were hard obstacles to overcome, but the adherents of segregation were not to be denied, and after a long and bitter and often disheartening struggle they won their first victory, in the segregation of criminals. A separate and independent department of government was established for their care, although society retained in a large degree its old habit of regarding its criminals and its dependents in much the same light. But an opening had been made for segregation and its adherents were quick to press their advantage. They next demanded and obtained the segregation of the insane and followed this up by the successful demand for the segregation of epileptics, idiots, dependent children, the sick poor, homeless men and women and the helpless aged. The aim was not merely to assure to each of these classes distinct physical separation from others, but to give to each a government of its own so that it could receive the undivided attention and care of persons competent to do the work entrusted to them and held directly responsible for that work. So beneficial did the experiment of segregation prove to be that the practice of charity made strides for good after it was adopted far out of all proportion to progress in previous years. Indeed the benefits from segregation are so marked and so convincing that the policy has been extended to different conditions in the same class. This is particularly noticeable in the modern treatment of consumptives, for whom special hospitals are constructed and special diet prepared. And yet the subject has not been exhausted. It is susceptible of further development and closer application. There is a crying need for it in the care of helpless old persons, in the treatment of whom the causes of destitution and the moral character of the individual should always be considered. The demonstrated advantages of segregation may be summed up in the more intelligent attention that each class receives and in the choice of persons entrusted with the care of dependents, made with no other purpose in view than fitness for the position to be occupied. Poverty is not a crime, and the victims of poverty are no longer classed with criminals. As already mentioned the state has not always recognized this principle. On the contrary, its theory and its practice formerly forced the poverty-stricken individual into association with the criminal. In the last quarter of the 19th century convicted criminals wearing the uniform of the penitentiary were employed as nurses in public hospitals. When the force of union labor had driven prisoners as laborers out of the public streets, out of the public parks, off public works and from every other place where public moneys were expended for the improvement of the general community, prisoners wearing prison garb were retained as workmen in the public charitable institutions. At a time when it would have meant a race riot to have placed prisoners to care for the trees in the parks, to clean the cobblestones in the streets, or even to look after the sewers, the sick poor man, the helpless imbecile and the abandoned child were left in part to the care of convicts. This was done in the name of charity, but it was such a rank injustice to the individual, such a blot on the civilization of the community, that the long-growing and firmly founded conviction of earnest students of sociology rebelled against it and, by energetic insistence, won, step by step, a victory over such conditions.

The first great move toward the separation of the dependent poor from criminals was made in the introduction of the trained nurse into the public hospitals. It was potent in its influence and appealed so strongly to the sense of justice of all communities that to-day every hospital, public or private, has its corps of trained nurses; and the fact that once the place held by the trained nurse was held by a convict in prison garb is regarded as a barbaric horror. With the elimination of the convict as a nurse in the public hospitals, the cause of progress and reform was encouraged to extend its efforts to the elimination of prison labor in all public charitable institutions. The battle was not an easy one, but the adherents of reform never wavered. The divorce between the prisoner and the pauper to-day is complete in almost every civilized community.

Public sentiment has also gone deep into the study of the condition of children, looking always to the best chance to develop a dependent child, or a criminal child, into a good citizen. It recognized that environment is a powerful factor in the development of character,

and one of its chief endeavors has been to dissociate the plastic mind of childhood from impressions that would tend to retard reform in a child already started on the downward path, as well as to protect a child not contaminated by vicious surroundings from influences tending to contaminate it. The crowning work of this endeavor was the establishment of children's courts, wherein the cases of children charged with crime are tried, free from even the sight of adult criminals. See CHARITY ORGANIZATION SOCIETY; CHARITIES AND CORRECTION, THE NATIONAL CONFERENCE OF; JUVENILE COURTS; DELINQUENT CHILDREN; PENSIONS, OLD AGE; PAUPERISM; SOCIOLOGY.

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CHARITIES AND CORRECTION, The National Conference of. An annual convention of social workers which originated with an invitation extended by the American Social Science Association to different State boards of public charities, the delegates from which met in New York city 20 and 22 May 1874. It was found at that time that the members of the various States' boards which deal with public charity in the United States were desirous of a better acquaintance with each other and that they could meet together and discuss the questions in which they had a common interest with mutual profit and encouragement. It also appeared that a considerable number of persons not officially connected with the public charities were desirous of attending such a meeting and were both competent and willing to join in its debates or to contribute papers which should be the fruit of special research or long experience. Annual meetings were established and in 1893 rules of procedure were published, giving a definition of membership requirements and a fee of $2. In 1897 the fee was raised to $2.50. In 1903, a special class of sustaining members was created in addition In 1916 the regular membership fee was raised to $3. The membership averages 3,000 and annual conferences are held in different cities throughout the nation. The permanent headquarters are at 315 Plymouth Court, Chicago, Ill. The history of organized social service and reform in the United States is revealed in the steady growth of this dignified and powerful association, and its usefulness is shown in the manner in which every branch of scientific social effort in America may be turned to the solution of all its main practical problems; practical application rivalling theory. Each year larger and extending issues have been attacked with confidence, a recent conference dealing with national measures to prevent unemployment, the abolition of alcoholism, the promotion of social programs and State policies in the treatment of the insane, feeble-minded and defective criminals. The quarterly 'Bulletins' and the annual 'Proceedings' constitute an encyclopædic storehouse on the social and charitable reform efforts of the United States. Consult 'Proceedings of the National Conference of Charities and Correction, 43d Annual Session' (Chicago 1916 and previous volumes back to 1874).

CHARITON, kăr'ĭ-tŏn, Greek prose writer: supposed to have flourished in the 5th or 6th century A.D. He was the author of a romance which describes the loves and adventures of Chæreas and Callirrhoë. Critics generally think that the birthplace usually assigned to the author is fictitious, and that it is by no means certain that he was a native of Aphrodisias in Caria. The romance was first published with a learned commentary by D'Orville (3 vols., 4to, Amsterdam 1750), from a MS. in Florence, the only one yet known.

CHARITON, Iowa, city and county-seat of Lucas County, situated on the Chariton River and on the Chicago, Burlington and Quincy and the Chicago, Rock Island and Pacific railroads. It is a fertile agricultural and stock-raising region, has coal mines and manufactures carriages and wagons, ice, cement blocks, agricultural implements, flour, windmills, tanks, pumps, pipes, etc. The city contains a public library and owns its waterworks. Pop. 3,794.

CHARITY (Fr. *charité*), one of the three great theological virtues, consisting of love to God and to men, or the disposition to love God with all our heart and our neighbor as ourselves. In a narrower sense, it signifies kindness and goodwill toward mankind in general, and in a still narrower sense, the giving of alms and the alms itself, philanthropy in its general sense. Charity also has the sense of liberality in judging others and their actions; and in law it has the sense of a gift in trust for the good of a community or a part of it; thus we have the term "public charities." Organized charity is the system of poor relief carried out by bodies of a quasi-public character, such as the Charity Organization Society in New York. See CHARITIES, PUBLIC.

CHARITY, Sisters of. See ORDERS, RELIGIOUS.

CHARITY ORGANIZATION SOCIETY. The title given to numerous civic associations in the United States and Canada organized for the relief and cure of poverty, some designated under the alternative titles of associated charities, bureau of charities and united charities. As described under CHARITIES, PUBLIC (q.v.), out of the feeling of the necessity for general co-operation in charity, organized charity has grown. To every student of sociology the conviction comes that, as in all departments of life, organization, law and order, efficiency is essential in the administration of charity. The first modern step in this direction was the formation of relief societies, designed to replace indiscriminate alms-giving by individuals, and intended to increase the funds available for the help of classes that might have been neglected. Then followed the associations for improving the condition of the

poor, which were not to deal in relief, except in so far as relief might tend to the permanent elevation of those relieved. The relief societies increased in numbers, but these organizations for the improvement of the condition of the poor generally lost sight of the fundamental purpose of the organization and developed into mere relief societies. Neither filled the want, and so a third form of organized charity came into existence usually designated "The Charity Organization Society." which developed what is generally known as the city plan. The city plan in a broad sense covers the whole program in which and by which a community attempts definitely and conscientiously to prepare and control its development. The object is to advance civilization by making cities capable of maintaining and reproducing a high type of human life, an object absolutely essential both to city and national life. No considerable proportion of the expense of public charity can or will be borne out of any public treasury, except that of the city. Therefore it becomes almost exclusively a problem of municipal planning and finance to provide for the activities which a rising social conscience in a community demands. No great public policy has ever resulted from the uncontrolled conflict of purely selfish and individual aims or the indifferent, easy-going *laissez-faire* attitude of the average taxpayer. To quote an historical example, the awful excesses of the Parisian starvelings of the French Revolution can be traced to the callous indifference of the royal parasitic, tax-imposing authorities, and unless this important problem is whole-heartedly looked after by the disinterested and generally unappreciated group of earnest social workers it is apt to be neglected. The cure for poverty lies not in the hands of the poor but in those of their more fortunate brethren. Since the first National Conference of Boards of Charities and Corrections, held in New York city 20–22 May 1874, and annually afterward in different localities, charity organization societies have multiplied in over 150 cities in the United States and interchange of ideas among affiliated relief societies is maintained and the working problems, ways and means and results of each year are discussed annually by means both of city and national conferences. On the general outline methods of a typical city association the evidence of Edward T. Devine, Ph.D., general secretary of the Charity Organization Society of the City of New York, founded in 1882, may be taken as authoritative. The first thing done is to investigate, and he says in his book, 'The Practice of Charity':

> In modern organized charity, investigation has come to mean something more than it had meant for those who had proclaimed the necessity for discriminating between the deserving and the undeserving. Investigation is not solely or even primarily for the purpose of thwarting the expectations of imposters. It is not even merely a device for preventing the waste of charity upon unworthy objects, in order that it may be used for those who are really in need. Investigation is rather an instrument for the intelligent treatment of distress. It is analogous to the diagnosis of the physician who does not attempt to treat a serious malady from a glance at its superficial indications, but who carefully inquiries into the hidden and early manifestations of the disease, and seeks to know as much as possible of the complicating influences with which he must reckon in effecting a cure. Investigation, therefore, while it should never be inconsiderate or blundering, or heartless, must be painstaking, conscientious and honest. This kind of an investigation has been developed as one feature of organized charity and its possibilities have been only gradually unfolded, and they are realized only gradually in the experience of individual workers. A bad investigation may be too full or too meagre, or it may be neither. The investigation is made not for its own sake, but as a necessary step in the careful remedy of the defects or misfortunes that have brought the applicant to seek relief. In the majority of cases, if the investigation is wise and complete, it will reveal personal sources and facts which will enable the situation to be met without calling in outside aid, and in this way, in the large proportion of instances, investigation might be said to become a substitute for relief.

The Charity Organization Society not only insists on investigations, but on co-operation. On this point Mr. Devine has this to say:

> By co-operation is meant not merely agreement among various societies and organized agencies, upon general plans of co-operation, but rather co-operation in dealing with individual cases of distress upon the basis of facts as ascertained by investigation. It involves, in other words, acceptance of the plan of relief which is calculated to remedy the defects or to supply the deficiencies that have been discovered. This may mean that each of the co-operating individuals or societies shall supplement the efforts of the others by contributing part of the money or work needed, or it may mean that they will agree to a division of the work, each leaving to the other the part for which its facilities are adapted; or it may mean a division of the cases to be dealt with, each agreeing to leave entirely to the other such classes of individuals or families whose needs are to be studied and adequately met by the agency to which they are assigned. One of the simplest forms of co-operation is that between the Church and the relief agency, secured by either directly from the other in the case of a given family, or secured by the agent of the Charity Organization Society from both. In this case the material needs should be supplied by the relief agency, and the Church should provide the necessary spiritual oversight and the necessary formative influences for the children, and, if necessary, reformative influences for older members of the family. It sometimes happens that the family has no need of reformation; that it contains within itself all the necessary resources for education and training, while the financial income alone is lacking, or not sufficient. Even in such circumstances, another friend may not be unwelcome in sickness or in trouble and in periods of unusual difficulty. Enlargement of social opportunities may all be entirely appropriate.

In order to carry out a scheme so comprehensive as this a machine was necessary, and charity organization made a machine, not merely to investigate objects of charity and to promote co-operation among all charitable agencies, but to keep a record of all work done in charity, and to employ individuals, competent and trained, to do that work. It even went further, and established schools for professional social workers in charity, who receive pay for charitable work. Organized charity, by its insistence upon co-operation and by its intelligent discussion of all matters pertaining to charity, exerts a powerful influence upon the State in its relation to charity. There can be no step backward by the State in its treatment of its dependents, which organized charity will not detect and seek to stop. The experience of its years of struggle to benefit the poor must be made known to officials having charge of charitable institutions and must be practically considered. The good done by organized charity is not confined to the relief that it gives individuals, or to the fraud that it detects, or to the imposition that it prevents, but it extends to the making of public opinion about charitable matters which forces good government in public charitable institutions.

State legislatures appoint State boards of charities whose duty it is to visit and inspect all institutions, whether State, county, municipal, incorporated or not incorporated, which are of a charitable, eleemosynary, correctional or reformatory character, the legislatures making provision for the education and support of the blind, the deaf and dumb and juvenile de-

linquents as seems proper, and recognizing and supporting the efforts of any county, city, town or village to provide for the care, support, maintenance and secular education of inmates of orphan asylums, homes for dependent children or correctional institutions, whether under public or private control. Representative of the numerous forms of public charity and of the co-operation and efficiency attained under a city plan is the list of societies and organizations represented by delegates at the annual New York city conferences, and also representative of the different complex problems involved is the list of subjects discussed (see CHARITIES AND CORRECTIONS, THE NATIONAL CONFERENCE OF). Consult 'Proceedings of the New York City Conference of Charities and Corrections' (Albany 1910 et seq.).

CHARLEMAGNE, shär'lĕ-mān. See CHARLES (CHARLEMAGNE).

CHARLEROI, shärl'rwä', Belgium, town, 20 miles southwest of Namur, containing extensive iron-works and mines. It was here Napoleon crossed the Sambre on his march to Waterloo. At the outbreak of the European War the town had a population of over 29,000. On 21 Aug. 1914 the 2d German army, under Von Buelow, had silenced the forts of Namur and on the 22d had pushed on to Charleroi, the headquarters of the 5th French army, under Lanrezac, holding the line of the Sambre, with the British on its left extending from Binche to Mons, thence westward to Condé. After a heavy bombardment the Germans entered Charleroi and turned it into a street battlefield. The fight raged fiercely from house to house, from the roofs and through the factories. The French colonials, Turcos and Zouaves furiously contested passages and alleys. Both Germans and French in turn were repeatedly driven out, and by night the town was in flames. The struggle continued all through the night, and in the morning the French were surprised by another German army, under Von Hausen, who attacked the right and compelled retreat. Simultaneously, the British were fighting on the left of Lanrezac in total ignorance of the latter's retreat. It was not till late in the afternoon that the British commander learned of the retreat and the fall of Namur. On the following day, 24 Aug. 1914, began the historic retreat that ended on the Marne.

Numerous charges of atrocities alleged to have been committed in the Charleroi district were laid against the German troops. The Bryce Report (q.v.) states that in the village of Tamines a large number of civilians, including aged people, women and children, were "deliberately killed," and that the public square was "littered with corpses." At Morlanwelz the mayor and his man-servant were shot and the town-hall and 62 houses burned. Several men were shot and houses burnt at Monceau-sur-Sambre, while at Montigny about 600 "hostages" were collected, several shot and 130 houses set on fire in the main street. See MONS; WAR, EUROPEAN: INVASION OF BELGIUM.

CHARLEROI, shär-lĕ-roi', Pa., city of Washington County, on the Monongahela River and on the Pennsylvania Railroad, 40 miles south of Pittsburgh. Industries include mining and the manufacturing of various kinds of glass and shovels. Charleroi was settled in 1890 and incorporated in the following year. The government is administered by a burgess, elected for four years, and a borough council, chosen on a general ticket. Pop. 9,615.

CHARLES (Karl Ludwig Johann Joseph Laurenz), Archduke of Austria, 3d son of the Emperor Leopold II: b. Florence, 5 Sept. 1771; d. Vienna, 30 April 1847. As soldier, statesman and military historian Charles was one of the most brilliant members of the Hapsburg family. At the time of his birth his father was Grand Duke of Tuscany and his uncle was Emperor (Joseph II). Charles spent his youth in Tuscany; his education was derived from General Spanocchi, Count Hohenwart and the Archduchess Christine Maria. A political party in Belgium desired to elect him "hereditary sovereign and grand duke," but The Hague Convention frustrated the plan. In his 20th year he distinguished himself at the battle of Jemappes; two years later he was made major-general and commanded the advance guard of Prince Josias of Saxony at Aldenhoven, Tirlemont and Neerwinden, defeating the French republican armies. In 1793 he was appointed governor-general of the Netherlands. His victories had recovered Belgium for Austria. He was appointed field-marshal of the empire and commander of the Austrian army on the Rhine in 1796; he opened the campaign by storming the heights of Altstetten and turning his retreat at Wetzlar into a victory over Jourdan. He followed this up with the other successes at Teining and Amberg, which compelled Moreau to make his memorable retreat. In the winter of 1797 he captured Kehl, the only position the French occupied in Germany, and on 11 November was appointed governor and captain-general of Bohemia. After the fruitless congress at Rastadt he put himself at the head of the Rhine army and again defeated his old opponent Jourdan at Ostrach and Stockach. Misunderstandings that arose between him and the Russian generals, Suwarow and Korsakow, and his weak state of health, compelled him to throw up his command and retire to Bohemia. In the protracted struggle in the heart of Germany Napoleon's genius was on every occasion triumphant; once only, at Aspern, did Charles snatch a victory from him, but the battle of Wagram laid Austria at the feet of the French Emperor. A particular interest attaches to the Archduke Charles from the fact that he was the uncle of Marie Louise and acted as proxy on behalf of Napoleon in the first marriage ceremony held in Vienna, 11 March 1810; thus half married, she proceeded to Paris and married the Emperor in person on 1 April.

CHARLES, 1ST DUKE OF LORRAINE: b. 953; d. Orleans 994. He early succeeded to his paternal inheritance. No sooner, however, was he invested with sovereign power, than he laid claim to the crown of France, on the death of Louis V, and immediately endeavored to sustain his claim by force of arms; but in the first battle fought between the two powers was made prisoner, his army entirely defeated and himself cast into a dungeon in the gloomy castle of Orleans, where he died a prisoner, 994.

CHARLES VII, Emperor of Austria and King of Hungary as Charles IV: b. Vienna, 17 Aug. 1887. He is a grandson of the late Karl

Ludwig, brother of the late Emperor-King, Francis Joseph, and Princess Annunciata, daughter of Ferdinand II of Naples, and son of the Archduke Otto Franz Joseph. On 21 Oct. 1911 he married Zita, Princess of Bourbon and Parma. He became heir apparent to the throne on the assassination of his uncle, the Archduke Francis Ferdinand, at Serajevo, Bosnia, 28 June 1914. He succeeded to the throne on the death of his grand-uncle, Emperor Francis Joseph, on 21 Nov. 1916, was crowned emperor at Vienna the December following. He was crowned king of Hungary and took the oath to the Hungarian constitution 29 Dec. 1916.

CHARLES (shärl) **I** ("le Chauve," or "the Bald"), King of France, son of Louis le Débonnaire: b. Frankfort-on-the-Main, 13 June 823; d. 877. He was invested by his father with the kingdoms of Alemania, Burgundy, Provence and Septimania, and subsequently with that of Aquitaine. On Louis' death in 840 Charles found himself confronted with two enemies — his half-brother Lothaire, who, as eldest son, claimed the whole of the Frank empire of Charlemagne, and his nephew Pepin, who asserted, in right of his father, a preferable claim to the sovereignty of Aquitaine. After considerable bloodshed, a treatv was entered into between Charles and Lothaire at Verdun (843), by which the former received, as his share of the dominions of Charlemagne, all those territories comprehended between the North Sea on the one part, and the Meuse, the Scheldt, the Saône, the Rhone and the Mediterranean on the other. In 875, by the death of his nephew, the Emperor Louis II, he gained possession of the Imperial crown, and thereby provoked the hostility of his brother, Louis the German, who ravaged the territory of Champagne and otherwise committed great havoc in his dominions. In 877 he proceeded to Italy on a crusade against the Saracens, to which he had been summoned by the Pope, but died when crossing Mount Cenis.

CHARLES II ("le Gros," or "the Fat"), King of France, also known as Charles III, Emperor of Germany: b. about 832; d. Neidingen, Suabia, 18 Jan. 888. He was the son of Louis the German and the grandson of Louis le Débonnaire, and was recognized as Emperor of Germany by the Pope. In 885 he ascended the French throne, to the prejudice of his cousin, Charles the Simple, whose youth prevented him from asserting his rights, but in 887 he was deposed, and the following year died miserably, strangled, as is asserted, by his servants.

CHARLES III ("the Simple"), King of France, the posthumous son of Louis the Stammerer: b. 17 Sept. 879; d. 929. On his father's death France was divided between Charles' two brothers, Louis III and Carloman, and an aristocratic oligarchv. On the death of his brothers he ought in right to have ascended the throne, but his extreme youth prevented his claims being recognized, and his cousin, Charles the Fat, was proclaimed king in 885. On the deposition of the latter in 887 Count Eudes of Paris succeeded in obtaining the crown; but his death in 898 left Charles undisputed king of the whole country. The reign of Charles is chiefly noted for the piratical incursions of the Northmen or Normans, who ravaged the coasts of France, sailed up the principal rivers and spread such dismay that, to conciliate them and put an end to their devastations, he agreed to cede to their chief, Rollo, the territory of Normandy, to be held as a fief of the French Crown. Latterly also Charles' tranquillity was much disturbed by the turbulence of some of his great vassals, who broke into open rebellion, declared the throne forfeited and proclaimed as king, Robert, brother of Count Eudes. Through the treachery of Herbert, Count of Vermandois, Charles was inveigled into the town and imprisoned in the fortress of Peronne. From this he was only liberated a short time before his death. Consult Eckel, A., 'Charles le Simple' (Paris 1899).

CHARLES IV ("the Fair"), King of France, 3d son of Philippe le Bel: b. 1294; d. 1328. In virtue of the Salic law he ascended the throne in 1322, to the exclusion of the daughters of Philip the Long. He reigned six years, dying in 1328 without male issue, the last of the direct line descended from Hugh Capet. Isabella, his sister, married Edward II of England, and was materially aided by Charles in fitting out, along with her paramour Mortimer, the expedition which resulted in the dethronement of her husband.

CHARLES V ("the Wise"), King of France, son of John II: b. Vincennes, 21 Jan. 1337; d. there, 16 Sept. 1380. While duke of Normandy, and during the captivity of his father in England, after the battle of Poitiers, he took the title of lieutenant of the kingdom. The vices and extravagances of the court were extreme, and the demands of the States-General for reform, headed by Stephen Marcel, provost of the merchants of Paris, were loudly and persistently urged. This assembly was supported in its claims by Charles the Bad, King of Navarre, who, as grandson of Louis le Hutin, maintained a preferable right to the crown. By artfully temporizing Charles contrived to detach the leading orders from the cause of the states, and having brought about indirectly the assassination of Marcel, succeeded in crushing their party. Meantime his father, John, still continued in captivity in England till liberated by the Treaty of Brétigny in 1360. Four years afterward he died, leaving Charles as successor to the French crown. The reign of the latter presents a series of combined hostilities and intrigues carried on with the view of establishing his power and extending his dominions. Great defensive skill was shown in his wars, and in these he was so far successful as to keep at bay the King of Navarre and deprive the English of a great part of their possessions in France. The magnanimity and wisdom of Charles have been greatly commended by some writers, and if we make due allowance for the times in which he lived, the high character which these have assigned him may not appear overcharged. That in his public administration, however, he was guilty of various acts of perfidy and cruelty cannot be disputed. He possessed some literary tastes and was the founder of the Bibliothèque Royale. He erected the Bastile for the purpose of overawing the Parisians, whose outbreaks

he had found reason to dread. Consult Delacheval, 'Histoire de Charles V' (Paris 1908).

CHARLES VI ("the Silly"), King of France, and son of Charles V: b. Paris, 3 Dec. 1368; d. 21 Oct. 1422. When his father died he was not 12 years old, and the contending pretensions of his uncles, the dukes of Anjou, Berry, Burgundy and Bourbon, rendered his minority one of unbounded turbulence and license. In 1385 he married at Amiens Isabella of Bavaria. In 1388 he declared himself independent of guardians and took the reins of government into his own hands. His mild and amiable though somewhat dissipated character had already secured for him a considerable share of popularity, when he was overtaken by the loss of his reason—a condition in which, with a few lucid intervals, he remained to the end of his days. The origin of this was constitutional, aggravated by a fright and a severe accident. Perhaps at no period in her history was France the scene of greater disasters and miseries than during the reign of this unhappy prince. The rival factions of the Burgundians and the Armagnacs kept up constantly throughout the country the horrors of a most rancorous civil war; while brigandage and every kind of violence prevailed to the most fearful extent. Such a conjunction afforded the most favorable opportunity for an invader; and accordingly, in 1415, Henry V of England crossed over to Normandy with a numerous army, took Harfleur by storm and signally defeated the French forces in the battle of Agincourt. Improving these advantages he advanced into the country, gained possession of the capital and compelled the crazy King to sign the Treaty of Troyes (1420), by which his daughter Catharine was given in marriage to Henry, and Charles was also forced to disinherit his own son and to acknowledge Henry as his successor. Neither monarch long survived this celebrated paction, both dying within a few months of each other.

CHARLES VII, King of France, 5th son of Charles VI: b. Paris, 22 Feb. 1403; d. Mehun, 22 July 1461. He became, by the successive deaths of his elder brothers, Dauphin and heir-presumptive to the crown. On the King of England's death in 1422 his son, Henry VI, was proclaimed King of France at Paris. The war with the National party, represented by the Orleanist faction, with the Dauphin at their head, was maintained for several years by the English, under the command of the Duke of Bedford. So successfully did the latter conduct operations that Charles was brought to the verge of despair, and almost reduced to abandon the struggle as hopeless, when his fortunes were retrieved by the arrival in his camp of the Maid of Orleans, who by the enthusiasm which she inspired first turned the tide of success against the English. (See JOAN OF ARC). The fresh spirit thus infused into the French was heightened by mismanagement on the part of the English, whose military operations were conducted with greatly diminished skill after the death of the Duke of Bedford, while discord and confusion prevailed in the home councils. Through the intervention of the Earl of Suffolk a marriage was concluded between the young King Henry VI and Margaret of Anjou, niece of Charles VII's queen. In the treaty entered into on this occasion the territory of Maine was secretly surrendered to France, and subsequently, on hostilities being resumed between the two countries, the troops of Charles conquered the whole of Guienne and finally expelled the English from all their possessions in France except Calais. The last years of Charles' reign were embittered by domestic broils, in which his son and successor, Louis XI, took a prominent part against his father. So hemmed in at last was the latter by the emissaries of the Dauphin that he conceived the idea of Louis having formed a deliberate plan to poison him; and so firmly was this notion rooted in his mind that he could only with the greatest difficulty be induced to take any food. A romantic interest has been thrown around Charles VII by his early reverses and the re-establishment of French nationality, which he effected mainly through the heroism inspired by the Maid of Orleans. His personal character, however, was weak and contemptible, without energy and without principle, and he surrendered himself continually to sensual and degrading pleasures. His share in the treacherous murder of the Duke of Burgundy, and base abandonment to her fate of Joan of Arc, are stains on his memory which cannot be effaced. Consult 'Lives' by Beaucourt and Vireville.

CHARLES VIII, King of France, son of Louis XI: b. Amboise, 30 June 1470; d. there, 8 April 1498. He succeeded his father in 1483, his sister, Anne de Beaujeu, acting as regent till he attained the age of 20. In 1491 he married Anne, the heiress of Brittany, and thereby annexed that important duchy to the French Crown. By so doing, however, he both broke faith with the daughter of Maximilian, king of the Romans, to whom he had been espoused, and also robbed Maximilian of his bride, a marriage by proxy having been already concluded between him and Anne. The leading incident of Charles VIII's reign is his Italian expedition and conquest of the kingdom of Naples, to which he was instigated by Ludovico Sforza, the usurping Duke of Milan. The pretension to Naples was asserted in virtue of the rights to that sovereignty transmitted by the house of Anjou to the royal family of France. The whole of Charles' expedition reads like a page from one of the old chivalrous romances. With an army of 30,000 men, unprovided either with money or stores, he suddenly crossed the Alps, advanced rapidly southward, and meeting with scarcely any obstruction, arrived before the walls and gained possession of Naples. This conquest, however, he did not retain for many months. Having left 5,000 men to guard his new acquisition he returned to France, and had scarcely reached it when the arms of Gonsalvo de Cordova effected the reannexation of Naples to Spain. The expedition of Charles VIII left thus hardly a trace upon the country, but is memorable as the commencement of that series of incursions into Italy by France and other northern nations which deluged that land with blood. He left no children, and was succeeded by his relative, the Duke of Orleans, under the title of Louis XII. Consult De Cherrier, 'Histoire de Charles VIII' (Paris 1888); Ségur, 'Histoire de Charles VIII'

(Paris 1884); Delaborde, 'Charles VIII en Italie' (Paris 1884); and translation of 'Memoir' of Philip de Comines (London 1855).

CHARLES IX, King of France, son of Henry II and Catharine de Medici: b. Saint Germain-en-Laye, 27 June 1550; d. 30 May 1574. He ascended the throne at the age of 10, after the death of his brother, Francis II, and his mother assumed the regency. Parliament acquiesced in this resolution, to avoid exciting new contests between the Guises and the princes of the blood. The Duke of Guise, who obtained possession of the person of the young King, was shot by an assassin before Orleans, in February 1563. In his last moments he advised the King and the Queen mother to negotiate with the parties. This advice was followed; a treaty was signed 19 March, and Havre taken from the English 27 July. The King, who was the same year declared of age, visited the provinces in company with his mother. At Bayonne he had a meeting with his sister Isabella, the wife of Philip II of Spain. This excited such suspicions in the Calvinists that they took up arms, and immediately formed the plan of attacking the King on his return to Paris. Being warned in season he escaped the danger: but this plot could not fail to arouse the hatred of Charles. After the battle of Saint Denis, 1567, in which the Constable of Montmorenci lost his life, Catharine entered into negotiations for peace. But the Calvinists reserved certain of the places which they were to have surrendered and continued to keep up a communication with England and the German princes. A new civil war soon broke out. Notwithstanding the jealousy of Charles, Catharine placed the Duke of Anjou, his brother, at the head of the royal army. The Prince of Condé was shot in the battle of Jarnac in 1569, and the Admiral Coligny defeated at Montcontour in the same year, after which the King concluded peace (1570) on terms so favorable to the Calvinists that they seem even to have suspected treachery under them. The heads of that party did not therefore all appear at court when Charles celebrated his marriage with Elizabeth, the daughter of Maximilian II. By degrees this distrust disappeared, and the marriage of the young King of Navarre (afterward Henry IV) with Margaret, sister of Charles X, seemed to banish every suspicion. This marriage took place 18 Aug. 1572. But under the sinister influence of his mother a diabolical plot was being framed. On the 22d the first attempt was made on the life of Coligny, and on the 24th began that massacre known under the name of the massacre of Saint Bartholomew, from having taken place on the night of the festival of that saint. Civil war broke out for the fourth time, and Catharine now became aware of the errors of her policy. Charles could no longer conceal his aversion to her, and was on the point of assuming himself the reins of government, when he died, childless, in 1574. Consult Mérimée, 'Chronique du règne de Charles IX' (Paris 1889).

CHARLES X, Comte d'Artois, King of France: b. Versailles, 9 Oct. 1757; d. Göritz, Austria, 6 Nov. 1836; grandson of Louis XV. He was the youngest son of the Dauphin and brother of Louis XVI. He spent a dissipated youth, and left France in 1789, after the first popular insurrection and destruction of the Bastile. After Louis XVI had accepted the constitution of 1791, he invited Charles to return to France, but he refused, and the Legislative Assembly, after stopping his allowance on the civil list, confiscated his property in 1792. He afterward assumed the command of a body of émigrés, and acted in concert with the Austrian and Prussian armies on the Rhine. At a later period he made a descent on the coast of Brittany, but despairing of success, withdrew to England, and for several years found an asylum in the palace of Holyrood at Edinburgh. After the downfall of Napoleon he entered France with the title of lieutenant-general of the kingdom and issued a judicious proclamation, promising the reign of law and an entire oblivion of the past. In 1824 he succeeded his brother, Louis XVIII, under the title of Charles X, and gained a momentary popularity by the abolition of the censorship of the press, but reactionary measures soon followed, and the spirit of disaffection was so widely spread that a collision with the popular party became inevitable. Charles X endeavored to gain the start by a *coup d'état,* and issued his celebrated ordonnances putting an end to the freedom of the press, decreeing a new method of election and setting aside a recent election to the Chamber. The revolutionary movement triumphed, and he was ignominiously driven from the throne in 1830. After formally abdicating in favor of his grandson, the Duc de Bordeaux, he revisited England, resumed his residence for a short time at Holyrood and finally settled at Göritz in Styria. He was the last sovereign of the elder line of the house of Bourbon, a typical member of the family, incapable of learning and incapable of forgetting. See Loireux, 'Histoire du règne de Charles X' (1834).

CHARLES I, King of Germany. See Charles (Charlemagne).

CHARLES II, King of Germany. See Charles I of France.

CHARLES III, surnamed Le Gros, King of Germany. See Charles II of France.

CHARLES I, King of Great Britain and Ireland: b. Dunfermline, Scotland, 19 Nov. 1600; d. London, 30 Jan. 1649. He was the second son of James VI and Anne of Denmark. James succeeded to the crown of England in 1603, and on the death of Prince Henry in 1612 Charles became heir-apparent. Little is recorded of him previous to his romantic journey into Spain in 1623 in company with Buckingham, in order to pay his court in person to the Spanish Infanta. Through the arrogance of Buckingham this match was prevented, and the Prince was soon after contracted to Henrietta Maria, daughter of Henry IV of France. In 1625 he succeeded to the throne on the death of his father. The first Parliament which he summoned, being much more disposed to state grievances than grant supplies, was dissolved; and by loans and other expedients an expedition was fitted out against Spain (1626) which terminated in disgrace and disappointment. In the next year a new Parliament was summoned, and the distrust and jealousy prevailing between the King and this assembly laid the foundation of the misfor-

tunes of his reign. The House of Commons held fast the public purse, and he intimated a design of following new counsels should they continue to resist his will, and suddenly and angrily dissolved them, after a short session, while they were preparing a remonstrance against the levying of tonnage and poundage without consent of Parliament. Charles then began to employ his threatened mode of raising funds by loans, benevolences and similar unconstitutional proceedings; which, however partially sanctioned by precedent, were wholly opposed to the rising spirit of civil liberty and to the constitutional doctrine which renders the Commons the guardian and dispenser of the public treasure. His difficulties were further increased by a war with France, intended to gratify the private enmity of Buckingham, who added to the odium against him by an ill-fated expedition to assist the Huguenots of Rochelle (1627).

In 1628 the King was obliged to call a new Parliament, which showed itself as much opposed to arbitrary measures as its predecessor, and after voting the supplies prepared a bill called "A Petition of Right, Recognizing all the Legal Privileges of the Subject," which, notwithstanding the employment of all manner of arts and expedients to avoid it, Charles was constrained to pass into a law.

The assassination of Buckingham in August 1628 removed one source of discord, but the Parliament which met in January 1629 manifested so determined a spirit against the King's claim of levying tonnage and poundage by his own authority, that it was suddenly dissolved, and Charles was determined to try to reign without one. For this purpose, having judiciously terminated the pending wars between France and Spain, he raised Sir Thomas Wentworth, after celebrated as Lord Strafford, to the principal place in his councils. This able statesman had begun his political career in opposition to the court, but having been gained over, was by his austerity, talent and firmness, a fit instrument to curb the spirit of resistance to prerogative, which had become so strong among the Commons. In ecclesiastical affairs Charles, unhappily for himself and the Church, was guided by the counsels of Laud, then bishop of London, a prelate whose learning and piety were accompanied by a zeal as indiscreet as intolerant.

Under these counsels about 11 years passed away in the execution of plans for raising money without the aid of Parliament, with other dangerous expedients. The arbitrary courts of high commission and star chamber, in the hands of Laud, also exercised in many instances the most grievous oppression. In 1634 ship money began to be levied, which being strictly applied to naval purposes, the nation at large acquiesced in it with less than usual repugnance; and some writers, who attacked the court in opposition to the principle, were treated with so much severity that others were deterred from following their example. So desperate did the cause of liberty at this time appear, that great numbers of the Puritans emigrated to New England. It was in 1635 that Hampden commenced his resistance to the payment of ship money, the right to levy which, without authority of Parliament, he was determined to bring before a court of law. His cause was argued in 1638 for 12 days in the Court of Exchequer; and although he lost it by the decision of eight of the judges out of 12, the discussion of the question produced a very powerful impression on the public mind.

It was in Scotland, however, that formal warlike opposition was commenced. From the beginning of his reign Charles had endeavored to introduce into that country a liturgy copied from the English — an innovation which produced the most violent tumults and ended in the formation of the famous "Covenant" in 1638, by which all classes of people mutually engaged to stand by each other and the abolition of episcopacy. The covenanters levied an army, which the King, opposed by an ill-disciplined English force, so equivocally inclined, that, not able to trust it, Charles agreed to a pacification known as the Treaty of Berwick (1639). His finances being exhausted, after an intermission of 11 years, he again assembled Parliament, which, as usual, began to state grievances previous to granting supplies. Losing all patience, the King once more hastily dissolved it, and prosecuted several members who had distinguished themselves by their opposition. Raising money in the best manner he could devise, an English army was again made to proceed toward the north; but, being defeated by the Scots, it became obvious that affairs could no longer be managed without a Parliament, and in 1640 that dreaded assembly was again summoned, which proved to be the famous Long Parliament, whose career forms so memorable a chapter in English history. Charles soon found himself obliged to be a comparatively passive spectator of the ascendency of the House of Commons and was obliged, both in Scotland and in England, to yield to the torrent which assailed him.

In the meantime a flame burst out in Ireland, which had no small effect in kindling the ensuing conflagration at home. The oppressed Roman Catholic population of that country, during the confusion of the times, rose against the government for the purpose of regaining their rights. Very exaggerated accounts of the massacre of the Protestants are given by several historians. Later writers have established the fact that the number who perished in this insurrection was not great.

The Parliament being summoned, the King left the conduct of the war entirely to it; but it now became evident that the Commons intended systematically to pursue their advantages and to reduce the Crown to a state of complete dependence. They framed a remonstrance containing a recapitulation of all the errors of the reign; renewed an attempt for excluding bishops from the House of Lords; passed ordinances against superstitious practices and so inflamed the popular odium against the Episcopal orders as to intimidate its members from attending to their duty in Parliament.

At length, it being apparent that either zealous adherents or prerogative of those anxious to establish the government on a more democratic basis must give way, Charles caused his attorney-general to enter, in the House of Peers, an accusation against five leading members of the Commons, and sent a

sergeant-at-arms to the House to demand them. Receiving an evasive answer, he, the next day (4 Jan. 1642), proceeded himself to the House, with an armed retinue, to seize their persons. Aware of this intention, they had previously withdrawn; but the King's appearance with a guard caused the House to break up in great disorder and indignation. The accused members retired into the city, where a committee of the House was appointed to sit, and the city militia was mustered under an officer appointed by Parliament, which also demanded control of the army. Here the King made his last stand, the matter having now arrived at a point which arms alone could decide. The Queen fled to Holland to procure ammunition, and Charles, with the Prince of Wales, proceeded north, and for a time fixed his residence at York. The King was received in his progress with great demonstrations of loyalty from the gentry; and many eminent and virtuous characters, the conscientious opposers of his arbitrary measures in the first instance, now joined his party. On the other hand, all the Puritans, the inhabitants of the great trading towns and those who had adopted republican notions of government, sided with the Parliament; and in no public contest was more private and public virtue ranged on both sides, however alloyed, as in all such cases, with ambition, bigotry and the baser passions. The royal standard was raised at Nottingham, 22 Aug. 1642.

The first action of consequence in the civil war was the battle of Edge Hill 23 Oct. 1642, which, although indecisive, enabled the King to approach London and produced considerable alarm. Nothing decisive, however, happened against the royal side till the battle of Marston Moor, which was gained chiefly by the skill and valor of Cromwell. Montrose's succession in the Scottish highlands in 1644–45 created divisions in favor of the royalists. The succeeding year (2 July 1644), however, completed the ruin of the King's affairs, by the loss of the battle of Naseby (14 June 1645).

Thenceforward a series of disasters attended his armies throughout the kingdom, and he took the resolution of throwing himself into the hands of the Scottish army, then lying before Newark, 5 May 1646. He was received with respect, although placed under guard as a prisoner; and, a series of abortive negotiations ensuing, an agreement was made with Parliament to surrender him to their commissioners, on the payment of a large sum, claimed as arrears by the Scottish army. The King was accordingly surrendered to the commissioners appointed 30 Jan. 1647, and carried, in the first place, to Holmby House, in Northamptonshire; subsequently to the headquarters of the army at Reading; and soon after to Hampton Court. In the meantime, however, the army and Independents becoming all powerful, he was led into some fears for his personal safety, and, making his escape with a few attendants, proceeded to the south coast. Not meeting a vessel, as he expected, he crossed over to the Isle of Wight, and put himself into the hands of Hammond, the governor, by whom he was lodged in Carisbrooke Castle.

While the King was in this situation, the Scots, regretting the manner in which they had delivered him up, and indignant at the proceedings of the English, marched a considerable army to his relief, under the Duke of Hamilton. This force, although strengthened by a large body of English royalists, was entirely routed and dispersed by Cromwell at Preston, as were the insurgents in Kent and Essex by Fairfax. During this employment of the army and its leaders a new negotiation was opened with the King in the Isle of Wight, who agreed to nearly everything demanded of him, except the abolition of Episcopacy; and so much had it now become the interest of the Parliament itself to comply with him, that a vote was at length carried that the King's concessions were a sufficient ground for a treaty. The triumphant army, however, on its return, cleared the House by what is historically known as Pride's Purge (6 Dec.) of all the members opposed to his views; and thereby procuring a reversal of this vote, the King's person was again seized, and, being brought from the Isle of Wight to Hurst Castle, preparations were made for trying him on the capital charge of high treason against the people. As the House of Lords refused to concur in a vote for this purpose, the Commons declared its concurrence unnecessary; and the King, being conducted to London and stripped of all marks of royalty, was brought before the court of justice specially created for this unprecedented trial, on 20 Jan. 1649.

The behavior of Charles had been calm and dignified throughout his adversities, and in no respect was it more so than during his trial. Three times he objected to the authority of the court when brought before it, and supported his refusal by clear and cogent arguments. At length, evidence being heard against him on the proof that he had appeared in arms against the Parliamentary forces, sentence of death was pronounced against him. He requested a conference with both Houses, which was rejected, and only three days were allowed him to prepare for his fate. After passing the three days in religious exercises, and in tender interviews with his friends and family, he was led to the scaffold. His execution took place before the Banqueting House, Whitehall, on 30 Jan. 1649, where, after addressing the people around him with great firmness and composure, the ill-fated King submitted to the fatal stroke.

Thus died Charles I, in the 49th year of his age. He was, in an eminent degree, temperate, chaste and religious, and although somewhat cold and reserved in demeanor, was really kind and affectionate. His talents were considerable; but he was deficient in decision and self-reliance necessary to superior executive ability, and constitutionally incapable of seeing any side of a question except his own. His mind was cultivated by letters and a taste for the polite arts, particularly painting, the professors of which he munificently encouraged; and his collections of work on art show judgment in the selection. To all these personal and private requirements he joined a graceful figure and pleasing countenance, and, under happier circumstances, would doubtless have been regarded as a very accomplished sovereign.

With respect to his political character, as exhibited in the great struggle between himself and the Parliament, it is impossible not to perceive that he strove to maintain a portion of prerogative that had become incompatible with

any theory of civil and religious liberty; but it is equally certain that he only sought to retain what his predecessors had possessed. There are periods in the history of every people in which old and new opinions conflict, and a concussion becomes unavoidable; and it was the misfortune of Charles to occupy the throne at a time when the development of the representative system necessarily brought it into conflict with the claims of prerogative. If the Parliament had acquiesced in the kingly pretensions, as usually explained by Laud and the high churchmen of the day, it would have dwindled into a mere registry of royal edicts, like those of France. On the other hand, Charles acted a part which every monarch in his situation may be expected to act; for a philosophical appreciation of the true nature of a political crisis is scarcely to be expected from one who sits upon a throne. The most forcible accusation against Charles is on the score of insincerity. It is asserted that he never intended to fulfill the conditions imposed upon him, that all his compliances were feigned. This can scarcely be denied; but it is equally certain that some of the conditions might justly be deemed questionable, and may even have been imposed in order to produce that conduct in the King which so naturally followed.

Bibliography.— 'Eikon Basilike: The Portraiture of His Sacred Majesty in His Solitude and Sufferings,' purporting to be written by Charles I, but in reality the work of John Gauden of Worcester, was published at The Hague in 1648. Consult also Chancellor, E. B., 'Life of Charles I, 1600–25' (1886); Clarendon's 'History of the Great Rebellion'; Disraeli, I., 'Commentaries on the Life and Reign of Charles I' (5 vols., London, 1828–31); Gardiner, S. R., 'History of England, 1603–42' (10 vols., new ed., London 1883–84); his 'Civil War' (4 vols., London 1894–97); and 'Constitutional Documents' (Oxford 1889); 'Ranke's History of England' (trans. by Boase and Kitchin, 6 vols., Oxford 1875); Whitelocke, 'Memorials' (4 vols., Oxford 1853); and 'Calendar of State Papers' (ed. by Hamilton, London 1890–93).

CHARLES II, King of Great Britain and Ireland, son of Charles I and Henrietta Maria of France: b. London, 29 May 1630; d. there, 6 Feb. 1685. He was a refugee at The Hague on the death of his father, on which he immediately assumed the royal title. He listened to an invitation from the Scots, who had proclaimed him their king 5 Feb. 1649, and arrived in the Cromarty Firth 16 June 1650. Being obliged to throw himself into the hands of rigid Presbyterians, they subjected him to many humiliations and mortifications, which caused him to regard them ever after with extreme aversion. On 3 Sept. 1650 the Covenanting army was defeated by Cromwell at Dunbar. In 1651 Charles was crowned at Scone; but the approach of Cromwell soon rendered his abode in Scotland unsafe. Hoping to be joined by the English royalists, he took the spirited resolution of passing Cromwell and entering England, Carlisle readily throwing open its gates to receive him. He was immediately pursued by that active commander, who, with a superior army, gained the battle of Worcester (3 Sept. 1651) and Charles, after a variety of imminent hazards, being on one occasion sheltered for 24 hours in the branches of the famous Boscobel oak, reached Shoreham, in Sussex, and from thence, France (16 October).

It is the province of history to state the circumstances that produced the Restoration, which General Monk so conducted that Charles, without a struggle, succeeded without hazard to all those dangerous prerogatives which had cost the nation so much blood and treasure, first to abridge and then to abolish. On 29 May 1660, Charles entered his capital amid universal and almost frantic acclamations; and the different civil and religious parties vied with each other in loyalty and submission. His first measures were prudent and conciliatory. Hyde, Lord Clarendon, was made Chancellor; and an act of indemnity was passed, from which those alone were excepted who were immediately concerned in the late King's death. A settled revenue was accepted in lieu of wardship and purveyance and the army was reduced. In respect to religion, there was less indulgence; for not only were prelacy and the parliamentary rights of bishops restored, which was to be expected, but an act of uniformity (1662) was passed, by the conditions of which nearly all the Presbyterian clergy were driven to a resignation of their livings. In 1662 he married Catherine of Braganza, a prudent and virtuous princess, but in no way calculated to acquire the affection of a man like Charles. The indolence of his temper and the expenses of his licentious way of life soon involved him in pecuniary difficulties; and the unpopular sale of Dunkirk in 1662 to the French was one of his earliest expedients to relieve himself.

In 1666 a rupture took place with Holland. It was attended, in the first instance, by various naval successes; but France and Denmark entering into the war, as allies of the Dutch, the English were overmatched, and a Dutch fleet entered the Thames, and, proceeding up the Medway, burned and destroyed ships as high as Chatham (13 June 1667). The domestic calamities of a dreadful plague in 1665, and of the great fire in London in 1666, were among the disasters of the period. Soon after, Clarendon, who had become very unpopular and was personally distasteful to Charles, was dismissed, and sought shelter from his enemies by a voluntary exile. A triple alliance between England, Holland and Sweden, for the purpose of checking the ambition of Louis XIV, followed (January 1668). It did honor to the political talents of Sir William Temple and was one of the few public measures of the reign which deserve approbation. In 1670 Charles threw himself into the hands of the five unprincipled ministers, collectively denominated the cabal, who supported him in every attempt to make himself independent of Parliament. The party troubles of this reign commenced about this time by the open declaration of the Duke of York, heir presumptive to the crown, that he was a convert to the Roman Catholic religion. Soon after the ministry broke the triple alliance and planned a rupture with the Dutch. On 20 May 1670 was signed the secret Treaty of Dover, under which the English King agreed to become a party to French aggression in the Netherlands and to favor the restoration of the Catholic religion

in England. As the price of this astounding betrayal, Charles, always in financial straits, received subsidies from France and thus became a pensioner of Louis XIV. As the King did not choose to apply to Parliament for money to carry on the projected war, he caused the exchequer to be shut up in January 1672. The naval operations (1672) against the Dutch were by no means successful, and a new Parliament being called, which strongly expressed the discontent of the nation, the cabal was dissolved and a separate peace made with Holland in 1674. Divisions in the Cabinet, fluctuations in the King's measures and parliamentary contests followed and occupied the next three years, till, in 1677, Charles performed a popular act, by marrying his niece, the Princess Mary, to the Prince of Orange. By taking some decided steps in favor of the Dutch he also forwarded the Peace of Nimeguen in 1678. The same year was distinguished by the pretended discovery of the Popish plot for the assassination of the King and the introduction of the Roman Catholic faith. Notwithstanding the infamous characters of Oates and Bedloe, and the improbable nature of their disclosures, their tale, supported by the general suspicions of the secret influence of a Catholic faction, met with universal belief, Parliament exhibiting nearly as much credulity and heat as the masses. Many Catholic lords were committed; Coleman, the Duke of York's secretary, and several priests hanged; and a venerable nobleman, the Earl of Stafford, beheaded. The Duke of York thought fit to retire to Brussels, and a bill for his exclusion from the throne passed the House of Commons. Such was the state of the country that Charles was obliged to give way to some popular measures, and the great palladium of civil liberty, the habeas corpus bill, passed during this session. The temper of the Parliament was so much excited that the King first prorogued and then dissolved it. The court now sought to establish a balance of parties; to distinguish which the terms Whig and Tory were about this time brought into use.

In 1680 a new Parliament assembled, and the Commons again passed the exclusion bill, which was rejected by the Lords. This Parliament was also dissolved in the next year and a new one called at Oxford, which proved so restive that a sudden dissolution ensued; and, like his father, Charles determined henceforward to govern without one. By the aid of the Tory gentry and the clergy he obtained loyal addresses from all parts of the kingdom, and attachment to high monarchical principles came again into vogue. The charge of plots and conspiracies was now brought against the Presbyterians. The Nonconformists generally were also treated with much rigor; and a step of great moment, in the progress to arbitrary power, was the instituting of suits at law (*quo warrantos*) against most of the corporations in the kingdom, by which they were intimidated to a resignation of their charters, in order to receive them back so modeled as to render them much more dependent than before. These rapid strides toward the destruction of liberty at length produced the celebrated Rye House plot, the parties to which certainly intended resistance; but that the assassination of the King was ever formally projected seems very doubtful. It certainly formed no part of the intention of Lord William Russell, whose execution, with that of Algernon Sidney, on account of the plot, forms one of the striking events of this disgraceful reign.

Charles was at this time as absolute as any sovereign in Europe; and had he been an active prince, the fetters of tyranny might have been completely riveted. Scotland, which at different periods of his reign had been driven into insurrection by the arbitrary attempts to restore Episcopacy, was very nearly dragooned into submission; and the relics of the Covenanters were suppressed with circumstances of great barbarity. On his death-bed Charles became reconciled to the Catholic Church and received the last sacraments.

The character of Charles II requires little analysis. He was a confirmed sensualist and voluptuary; and his reign was the era of the most dissolute manners that ever prevailed in England. A dependent and pensioner of Louis XIV, in his need for money he betrayed the interests of the country. He was absolutely without moral sense. He cared more for his mistresses than for his kingdom; the reigning one for the time being was the real centre of influence and authority. Charles was a man of wit; and he possessed an easy good nature, but united with it was a total indifference to anything but his own pleasure. Yet, with all his selfishness and demerits as a king, Charles always preserved a share of popularity with the multitude from the easiness of his manners. Pepy's 'Diary' and other private documents, however, clearly show the opinion of the more reflecting portion of his subjects; and it is now pretty generally admitted that, as he was himself a most dishonorable and heartless monarch and man, so his reign exhibited the English character in a more disgraceful light than any other in English history. It need not be added that he left many illegitimate children, the descendants of some of whom are still among the leading nobility of the country. The fate of his son by Lucy Walters, the ill-fated Duke of Monmouth, is an affair of history.

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CHARLES, or **CHARLEMAGNE** (CAROLUS MAGNUS), King of the Franks, and subsequently Emperor of the West, Holy Roman emperor: b. probably at Aix-la-Chapelle, 2 April 742; d. there 28 Jan. 814. His father was Pepin the Short, King of the Franks, son of Charles Martel. After the decease of his father, in 768, he was crowned king, and according to the wish of Pepin divided the Frankish dominions with his younger brother, Carloman; but the conditions of this partition were several times altered, without being ever adjusted to the satisfaction of the parties. Their mutual discontent was fostered principally by the King of the Lombards, Desiderius

(the father-in-law of both princes), because Charlemagne had repudiated his wife. Desiderius sought revenge for the rejection of his daughter by exciting and encouraging commotions in the realm, in which he was assisted by the circumstances that the nobles aspired to independence. The people of Aquitania were the first who attempted to become independent. Charlemagne marched against them with rather a small army; but he relied on the assistance of his brother, Carloman, to whom a portion of Aquitania then belonged. Carloman appeared indeed on the field, but at the decisive moment deserted his brother, who was obliged to sustain alone an unequal conflict. His great courage and conduct, after a long and doubtful contest, procured him the victory and the insurgents submitted (770). At Carloman's death in 771, and after the flight of his wife and her two sons to her father in Italy, Charlemagne made himself master of the whole empire, the extent of which was already very great, as it embraced, besides France, a large part of Germany. He now formed the plan of conquering the Saxons, for which his zeal for the diffusion of Christianity served as a pretext. The Saxons, in possession of Holstein and Westphalia, preferred pillaging to peaceful occupations, and a wandering to a settled mode of life. An irruption into the territory of the Franks was the alleged cause of the first war which Charlemagne began against them in 772. The other wars were produced by the rebellions of this warlike nation, which was never reduced to complete submission till the peace of Seltz, in 803, after it had embraced Christianity. Charlemagne deported great numbers of the Saxons to Flanders and Switzerland and their seats were occupied by the Obotrites, a vandal tribe in Mecklenburg. During 32 years did the Saxons resist a conqueror who, striving with equal eagerness to convert and to subdue them, never became master of their country till he had transformed it almost into a desert. They might have made a more successful defense had they not been distracted by internal dissensions. The most celebrated of their leaders was Wittikind, and next to him Albio, who embraced Christianity in 783.

While he was combating the Saxons on the banks of the Weser, Pope Adrian implored his assistance against Desiderius who had torn from him the exarchate of Ravenna, which Pepin the Short had presented to the Holy See, and who was urging the Pope to crown the nephews of Charlemagne, that Charlemagne himself might be considered a usurper. Charlemagne immediately left Germany and marched with his army to Italy. Desiderius fled to Pavia, which was bravely defended by the Lombards. The city fell, and Desiderius, with the widow and sons of Carloman, were carried prisoners to France. Desiderius ended his life in a monastery. In 774 Charlemagne was crowned king of Lombardy with the iron crown.

In 778 he repaired to Spain to assist a Moorish prince, conquered Pamplona, made himself master of the county of Barcelona and spread the terror of his name everywhere. But on his return his troops were surprised in the valley of Roncesvalles by some Saracens, in conjunction with the mountaineers, the Basques, and the rear-guard defeated; remarkable from the circumstance that Roland, one of the most famous warriors of those times, fell in the battle. (See RONCESVALLES). The disaffection of the tribes of Aquitania induced Charlemagne to give them a separate ruler: for this purpose he selected the youngest of his sons, Louis (called le Débonnaire). The Lombards were no less turbulent, and the Greeks made incessant efforts to conquer Italy; and the nobles to whom he had entrusted a part of the sovereignty of this country evinced little fidelity. He therefore gave them his second son, Pepin, for a monarch; his eldest son, Charles, remaining constantly with him, and assisting him in his manifold undertakings. In 781 he caused these two sons to be crowned by the Pope in Rome, hoping to render the royal dignity inviolable in the sight of their subjects. Charlemagne had another son, also called Pepin, who was the oldest of all his children, being the son of his divorced wife. This circumstance probably inspired the monarch with an aversion to the elder Pepin, and prevented him from admitting him to a share in the government.

After returning from Spain Charlemagne was again obliged to take the field against the Saxons. The year 790, the 22d of his reign, was the only one which he passed without taking up arms. As his power increased, he meditated more seriously the accomplishment of the plan of his ancestor, Charles Martel, to restore the Western empire. On Christmas Day (800) he was proclaimed Cæsar and Augustus by Pope Leo III; he was invested with the ornaments of the ancient Roman emperors. The weakness of the situation was, that the empire could not subsist long in a family where the authority was, by law, divided among the children of the deceased monarch. Pepin, King of Italy, died in 810, and his death was followed the next year by that of Charles, the eldest. Thus of his legitimate sons only one remained, Louis, King of Aquitania, whom Charlemagne adopted as his colleague in 813. Charles, who was five times married, was buried at Aix-la-Chapelle, his favorite and usual place of residence. He was deposited in a vault, where he was placed on a throne of gold, in full imperial costume.

Charlemagne was a friend of learning; he deserves the name of restorer of the sciences and teacher of his people. He attracted by his liberality the most distinguished scholars to his court; Charlemagne established an academy in his palace at Aix-la-Chapelle, the sittings of which he attended with all the scientific and literary men of his court. All the members of this academy assumed names characteristic of their talents or inclinations. From Italy he invited teachers of the languages and mathematics, and established them in the principal cities of his empire. In the cathedrals and monasteries he founded schools of theology and the liberal sciences. He strove assiduously to cultivate his mind by intercourse with scholars; and, to the time of his death, this intercourse remained his favorite recreation. His mother-tongue was a form of the Teutonic, but he spoke several languages readily, especially the Latin. He was less successful in writing, because he had not applied himself to it till he was further advanced in years. In the winter he read much, and even caused a person to read to him while he took his meals.

He was a powerful ally of the Church, and promoted its interests to the fullest extent. He endeavored to improve the liturgy and church music. He was desirous of introducing the Roman liturgy into his states; but the clergy, who clung to the ancient usages, offered some resistance. Several churches, however, complied with the wish of the monarch, and others mingled the Roman and Gallican liturgy. He attempted to introduce uniformity of measures and weights, but was unable to accomplish this design. Another abortive scheme of his, on which he employed his army, was to unite the Rhine with the Danube, and consequently the Atlantic with the Black Sea, by means of a canal. The arts, however, under his patronage, produced other monuments of his fame. The city of Aix-la-Chapelle received its name from a splendid chapel which he caused to be built of the most beautiful Italian marble. Charlemagne also erected baths in which more than 100 persons could swim in warm water. To Charlemagne France is indebted for its first advances in navigation. He encouraged agriculture, and made himself immortal by the wisdom of his laws. His fame filled even the East. He received ambassadors from the patriarch of Jerusalem, from the emperors Nicephorus and Michæl, and was twice complimented with embassies from Harun-al-Rashid, the famous caliph of Bagdad. He was inclined to exalt the ecclesiastical authority over the secular, and to him may be attributed the establishment of the Western Church as a temporal absolutism under the popes. His empire comprehended France, most of Catalonia, Navarre and Aragon; the Netherlands, Germany as far as the Elbe, Saale and Eyder, Upper and Middle Italy, Istria and a part of Sclavonia. The great work he had accomplished could only be maintained and consolidated by a succession of able rulers; but with his death, these not being forthcoming, his empire fell to pieces.

In private life Charlemagne was exceedingly amiable: a good father and generous friend. His domestic economy afforded a model of frugality; his person, a rare example of simplicity and greatness. He despised extravagance of dress in men, though, on solemn occasions, he appeared in all the splendor of majesty. His table was very plain. He was large of build and strong; his height, according to Einhard, equaled seven times the length of his foot. His head was round; his eyes large and lively; his nose of more than common size; his countenance had an agreeable expression of serenity. His gait was firm; his bearing manly. He enjoyed perfect health till the last four years of his life, when he was attacked by fevers and began to limp. In summer he was accustomed to repose for two hours after dinner, but at night he slept uneasily. He wore the dress of his country; on his body a linen shirt, over which was a coat with a silk border, and long breeches. For his outer dress he wore a cloak, and always his sword, the hilt and belt of which were of gold and silver. He possessed a natural impressive eloquence, and in his expression of countenance there was something to excite respect, united with gentleness and kindness.

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CHARLES IV, Holy Roman Emperor, of the house of Luxemburg: b. Prague, 14 May 1316; d. there, 29 Nov. 1378. He inherited the kingdom of Bohemia, and had been chosen emperor in 1346 by five electors, hoping to occupy the Imperial throne without opposition. But the princes of the empire regarded him as a servant of the Pope. He however used every effort to appease his enemies, married the daughter of the Elector of the Palatinate, gave Tyrol as a fief to the Elector of Brandenburg and was unanimously elected emperor and consecrated at Aix-la-Chapelle. But no sooner was he crowned than he took possession of the Imperial insignia and conveyed them to Bohemia. In 1354 the Emperor went to Italy to be crowned by the Pope; but this favor he purchased on terms which made him an object of ridicule and contempt. He engaged to appear without any armed force. Having been consecrated king of Italy at Milan, he confirmed the Visconti in the possession of all the usurpations of which he had pledged himself to deprive them. He also annulled all the acts of his grandfather, Henry VII, against Florence, and by a treaty concluded at Padua resigned the latter city, with Verona and Vicenza, to Venice. He refused the request of some Romans to claim the city, as belonging to him in the name of the empire, and in a treaty renounced all sovereignty over Rome, the states of the Church, Ferrara, Naples, Sicily, Sardinia and Corsica, and even took an oath not to return to Italy without the consent of the Pope.

Despised by the Guelphs, detested by the Ghibellines, Charles returned to Germany, where he issued the celebrated Golden Bull (1356), the rules of which applied in the elections of the German confederation until 1806. General indignation was excited by the proposal made by the papal nuncio, with his consent, to introduce a tax, equal to the tithe of all ecclesiastical revenues, for the benefit of the Holy See. All the members of the Diet opposed it; and Charles, in his anxiety to conciliate the princes of the empire, announced that he would propose to the assembly a reform of the Ger-

man clergy. The Pope, opposing this proposal of the Emperor, exhorted the electors to depose him. Charles immediately relapsed into his accustomed submissiveness, and not only abandoned all his reforms, but even confirmed, in 1359, all the privileges of the clergy and made them independent of the secular power. Such vacillating conduct subjected him to the contempt of both parties. Under such an emperor Germany could not enjoy internal tranquillity. The state of Italy was no less melancholy. Tuscany was suffering the evils of anarchy; Lombardy was distracted by civil wars and the Visconti had made themselves masters of the Milanese. During his residence in Italy he sold states and cities to the highest bidder, or, if they themselves offered most, made them independent republics. He was crowned king of Burgundy at Arles, 4 June 1365. Gregory XI having given his consent that his son Wenceslaus should be elected king of the Romans (1373), he employed his ill-gotten wealth to purchase the votes of the electors, who were irritated at the conduct of the Pope, and, moreover, distributed among them the domains of the empire on the Rhine and several free Imperial cities. Thus he attained his object. To maintain their rights against the arbitrary measures of the Emperor, the Imperial cities in Suabia formed the Suabian League, which Charles opposed in vain. His reign is notable for the improvement and prosperity of Bohemia; for the founding of the University of Prague (1348); for a terrible persecution of the Jews; and as the period when the sale of letters of nobility commenced in Germany. Consult Wernusky, 'Geschichte Kaiser Karls IV und seiner Zeit' (Innsbruck 1880–92).

CHARLES V, Holy Roman Emperor, and King of Spain (in the latter capacity he is called Charles I): b. Ghent, 24 Feb. 1500; d. Yuste, Spain, 21 Sept. 1558. He was educated in the Netherlands under the care of William of Croy, lord of Chièvres, who taught him history, formed him for affairs of state and from whom he acquired that gravity of manner which he retained through life. After the death of Ferdinand of Spain, his grandfather, in 1516, Charles assumed the title of king of Spain. The management of this kingdom was entrusted to the celebrated Cardinal Ximenes. In 1519 Charles, on the death of Maximilian, was elected emperor. He left Spain to take possession of his new dignity, for which he had to contend with Francis I, King of France. His coronation took place at Aix-la-Chapelle with extraordinary splendor. The progress of the Reformation in Germany demanded the care of the new emperor, who held a Diet at Worms. Luther, who appeared at this Diet with a safe conduct from Charles, defended his cause with energy and boldness. The Emperor kept silent; but after Luther's departure a severe edict appeared against him in his name who thought it his interest to declare himself the defender of the Roman Catholic Church.

In a very few years the power of Charles became a source of uneasiness to most other princes of Europe. Pope Clement VII placed himself at the head of a league of the principal states of Italy against the emperor, but their ill-directed efforts were productive of new misfortunes. Rome was taken by storm by the troops of the Constable of Bourbon, sacked, and the Pope himself made prisoner. Charles publicly disavowed the proceedings of the Constable, went into mourning with his court and carried his hypocrisy so far as to order prayers for the deliverance of the Pope. Henry VIII of England now allied himself with the French monarch against Charles, who accused Francis of having broken his word. The war was terminated in 1529 by the Treaty of Cambray, of which the conditions were favorable to the Emperor. Charles soon after left Spain, and was crowned in Bologna as king of Lombardy and Roman emperor. In 1530 he seemed desirous, at the Diet of Augsburg, to reconcile the various parties; but not succeeding, issued a decree against the Protestants, which they met by the Schmalkaldic League. Notwith-tanding his undertakings in favor of the Roman Catholic religion, Charles always practised moderation toward the Protestants whenever his interest left room for toleration. Nor did the Protestant princes hesitate to furnish their contingents when he was assembling an army against the Turks. Having compelled Solyman to retreat, he undertook in 1535 an expedition against Tunis, reinstated the Dey, and released 20,000 Christian slaves. This success added to his character something of the chivalric, which gave him still more influence in Christendom, and promoted his political projects.

The policy of Charles was to reconcile the two great religious parties, and with this end in view he alternately threatened and courted the Protestants. After some show of negotiation the Protestant princes raised the standard of war. The Emperor declared, in 1546, the heads of the league under the ban of the empire, excited divisions among the confederates, collected an army in haste, and obtained several advantages over his enemies. John Frederick, the Elector of Saxony, was taken prisoner in the battle of Mühlberg in 1547. Charles received him sternly, and gave him over to a court-martial consisting of Italians and Spaniards, under the presidency of Alva, which condemned him to death. The Elector saved his life only by renouncing his electorate and his hereditary estates, but remained a prisoner. Meanwhile the Emperor appeared somewhat more moderately inclined toward the vanquished party. On coming to Wittenberg he expressed surprise that the exercise of the Lutheran worship had been discontinued. On visiting the grave of Luther he said, "I do not war with the dead; let him rest in peace; he is already before his Judge." The Landgrave of Hesse-Cassel, one of the leaders of the Protestants, was compelled to sue for mercy. Notwithstanding his promise Charles deprived him of his freedom. After having dissolved the League of Schmalkalden the Emperor again occupied himself with the plan of uniting all religious parties, and for this purpose issued the Interim, which was as fruitless as the measures proposed by him at the Diet of Augsburg.

Neither was he successful in securing the Imperial crown for his son. Discord still agitated the public mind, and a new war broke out against him. Maurice of Saxony, whom he had invested with the electoral dignity, formed a league, which was joined by Henry II, King of France, the successor of Francis.

The preparations had been made with the greatest secrecy. Charles was at Innsbruck superintending the deliberations of the Council of Trent, and meditating great plans against France and Turkey. He was expecting the aid of Maurice when this prince threw off the mask, appeared suddenly at the head of an army, and, in 1552, invaded the Tyrol while Henry II entered Lorraine. Charles was nearly surprised in Innsbruck. Maurice abandoned the Imperial castle to plunder, the Council of Trent was dissolved, and the Protestants dictated the conditions of the Treaty of Passau in 1552. Charles was not more successful in Lorraine. He was unable to recover Metz, which was defended by the Duke of Guise. In Italy he lost Siena by a revolt. He withdrew to Brussels, where, hard pressed by his enemies, he became gloomy and dejected, and for several months concealed himself from the sight of every one, so that the report of his death was spread through Europe. His last exertions were directed against France, which constantly repelled his assaults. The Diet of Augsburg in 1555 confirmed the Treaty of Passau, and gave the Protestants equal rights with the Roman Catholics.

Charles, seeing all his plans frustrated and the number of his enemies increasing, resolved to transfer his hereditary states to his son Philip. Having convened the Estates of the Low Countries at Louvain, in 1555, he explained to them the grounds of his resolution, asserted that he had sacrificed himself for the interests of religion and of his subjects, but that his strength was inadequate to further exertion, and that he should devote to God the remainder of his days. At that time Charles conferred on Philip the sovereignty of the Netherlands alone. On 15 Jan. 1556 he conferred upon him, in like manner, the Spanish kingdoms and Sicily, reserving for himself merely a pension of 100,000 ducats. He selected for his residence the monastery of Saint Justus, near Plasencia in Estremadura, and here he exchanged sovereignty, dominion and pomp for the quiet and solitude of a cloister. His amusements were confined to short rides, to the cultivation of a garden and to mechanical labors. He attended religious services twice every day, read books of devotion and by degrees fell into such dejection that his faculties seemed almost impaired. He renounced the most innocent pleasures, and observed the rules of the monastic life in all their rigor.

Charles had a noble air and refined manners. He spoke little, and smiled seldom. Firm of purpose; slow to decide; prompt to execute; equally rich in resources and sagacious in the choice of them; gifted with a cool judgment, and always master of himself, circumstances developed his genius and made him great. Although he did not scruple to break his promises, he imposed, by the semblance of magnanimity and sincerity, even on those who had already experienced his perfidy. An acute judge of men, he knew how to use them for his purposes. In misfortune he appears greater than in prosperity. He protected and encouraged the arts and sciences, and is said to have picked up a brush which had fallen from the hand of Titian with the words, "Titian is worthy of being served by an emperor." By his wife Eleonora, daughter of Emanuel, King of Portugal, he had one son, afterward Philip II, and two daughters. He had also several natural children. No minister ever exercised a decided influence over him. He was indefatigable in business, weighing the reasons on both sides of every case with great minuteness. Wherever he was he imitated the customs of the country, and won the favor of all the peoples with whom he came into contact except the Germans. Consult Gachard, 'Correspondance de Charles Quint' (1859); 'Lives' by N. Robertson (Prescott's ed., 2 vols., London 1878); Armstrong (2 vols., London, with bibliographical introduction 1902); and Guntram (1865); Stirling, Maxwell, 'Cloister Life of the Emperor Charles V' (1852); Guntram, 'Kaiser Karl V' (1865).

CHARLES VI, Holy Roman Emperor, the 2d son of the Emperor Leopold I: b. 1 Oct. 1685; d. 20 Oct. 1740. His father destined him for the Spanish throne. The last prince of the house of Hapsburg, Charles II, disregarding the house of Austria, whose right to the Spanish throne was undoubted, according to the law of inheritance by descent, had by will made Philip, Duke of Anjou, second grandson of Louis XIV, heir to the Spanish monarchy. Accordingly, on the death of Charles II, 1 Nov. 1700, Philip took possession of the vacant kingdom. England and Holland united against him, and this alliance was soon joined by Prussia, Portugal and Savoy. Charles was proclaimed king of Spain at Vienna, in 1703, and proceeded by way of Holland to England, from whence, in January 1704, he set sail with 12,000 men for Spain, which was almost wholly occupied by the French, and landed in Catalonia. He succeeded in making himself master of Barcelona; but was soon besieged there by his rival, Philip V. At the head of a garrison of hardly 2,000 men, he made the most obstinate resistance, till the long-expected English fleet appeared, which compelled the French speedily to raise the siege. This event was followed by alternate reverses and successes. Twice Charles reached Madrid, and twice was he driven from the city. The first time, in 1706, he caused himself to be proclaimed king in the capital under the name of Charles III. He had been a second time compelled to flee to the walls of Barcelona, when he was informed of the death of his brother, Joseph I. According to the will of Leopold, this event placed the double crown of Charles V on his head; to his claims on Spain it added the more certain possession of the Austrian dominions. But the allies did not like to see so much power united in the same hands. Charles returned to Germany, and on his arrival learned that, at Eugene's suggestion, he had also been elected emperor. His coronation took place at Frankfort, in December 1711; and in the following year he received, at Presburg, the crown of Hungary. At the same time he still retained the empty title of King of Spain. He now prosecuted, under the conduct of Eugene, the Spanish war of succession; the allies concluded a peace with France at Utrecht in 1713, in spite of all the efforts of the Emperor to prevent it. He was obliged, in the following year, to sign the Treaty of Rastadt. This treaty secured him in the possession of Milan, Mantua, Sardinia and the Netherlands. To secure his dominions to his daughter, Maria Theresa, in

default of male heirs, Charles strove to induce the powers to guarantee the Pragmatic Sanction, which settled the succession in her favor. He succeeded in gaining the concurrence of all the European powers. The reign of this prince was marked with perpetual agitations. The succession to the Polish throne, after the death of Augustus II, in 1733, disturbed the peace of Europe. Charles, with Russia, supported the son of this prince; but France and Spain declared themselves for Stanislaus Leczinsky. From this arose a war, which terminated, in 1735, in the loss of the Two Sicilies and a part of the duchy of Milan. Austria received Tuscany in exchange for Lorraine, and obtained Parma. Hardly had Charles finished this war, when his alliance with Russia involved him anew in a war with the Turks. In 1737 his troops invaded Serbia without any declaration of war, and occupied Nissa. But the Turks renewed their attacks with a continually augmented force, and obliged the Emperor, after three unsuccessful campaigns, to cede to them by the Peace of Belgrade, in 1739, Wallachia and the Austrian part of Serbia, with Belgrade. Consult Coxe, 'History of the House of Austria' (Vol. III, 3d ed., London 1873).

CHARLES VII (properly CHARLES ALBERT). Holy Roman Emperor: b. Brussels, 6 Aug. 1697; d. Munich, 20 Jan. 1745. He was the son of Maximilian Emanuel, Elector of Bavaria, then governor of the Spanish Netherlands. His youth was spent at the Imperial court, and in the war against the Turks he commanded the army of auxiliaries sent by his father. In 1722 he married the daughter of Joseph I, having previously renounced with mental reservations all rights which this marriage might give him to the succession to the throne of Austria. In 1726 he succeeded his father as Elector of Bavaria. He was one of the princes who protested against the Pragmatic Sanction, guaranteed in 1732 by the Diet of Ratisbon, and in consequence concluded a defensive alliance with Saxony. After the death of Charles VI, in 1740, he refused to acknowledge Maria Theresa as his heiress, founding his own claims to the succession on a testament of Ferdinand I. He was supported by the king of France with a considerable force. In 1741 he was recognized at Lintz as Archduke of Austria. The obstacles thrown in his way by Cardinal Fleury, who wished not to dismember the Austrian monarchy, as well as the want of artillery and ammunition, prevented him from getting possession of Vienna. On the other hand he took Prague, where he was crowned and proclaimed king of Bohemia. In 1742 he was unanimously elected king of the Romans: he made a solemn entry into Frankfort, and was crowned by his brother, the Elector of Cologne. But fortune soon deserted him. The armies of Maria Theresa reconquered all Upper Austria, and overwhelmed Bavaria. It was necessary to abandon Bohemia. Charles fled to Frankfort, and convoked a diet, when an attack of the king of Prussia on Maria Theresa allowed him to return to Munich in 1744. He was succeeded in the electorate by his son Maximilian Joseph, and in the Imperial dignity by Francis I, husband of Maria Theresa.

CHARLES I, King of Portugal: b. 28 Sept. 1863; assassinated, Lisbon, 1 Feb. 1908. He was the son of Luiz I and of Maria, the daughter of Victor Emmanuel II of Italy, and came to the throne 19 Oct. 1889. After that event a powerful republican element made itself felt in Portugal. The heir to the throne, the Duke of Braganza, was assassinated along with his father, who was succeeded by his second son, Manoel.

CHARLES I (of HOHENZOLLERN-SIGMARINGEN), King of Rumania; b. Sigmaringen, Germany, 20 April 1839; d. 10 Oct. 1914. The second son of Prince Karl of Hohenzollern, he entered the Prussian army early and held the rank of lieutenant of dragoons when, at the suggestion of the Prussian Ambassador, he was elected prince of Rumania 10 May 1866. He took the field with the Rumanian army as an ally of Russia in the Russo-Turkish War of 1877, and bore a distinguished part at the siege of Plevna. He subsequently proclaimed Rumania independent of Turkey and was crowned king 22 May 1881. He married in 1869 Princess Elizabeth von Neuwied, who as "Carmen Sylva" (q.v.) is well known as an author. On the death of their only child, the succession was settled in 1889 on Prince Ferdinand of Hohenzollern-Sigmaringen, a nephew of the King. King Charles during his reign did a great deal for the political and industrial interests of his people.

CHARLES I, King of Spain. See CHARLES V, Holy Roman Emperor.

CHARLES II, King of Spain: b. 11 Nov. 1661; d. 1 Nov. 1700. He succeeded his father, Philip IV, in 1665. In this reign, Spain, which for nearly three centuries had held the foremost rank in Europe as a great military nation, began rapidly to decline both in influence and glory, but such was the prestige attached to its name and past history, that it had long become powerless before it ceased to be respected. The King was a degenerate, feeble-minded and inert, a puppet alternately in the hands of the French and Austrian factions at his courts. Charles died in 1700, bequeathing his throne to the Duke d'Anjou, grandson of Louis XIV of France, an act which led to the long and calamitous "War of the Spanish Succession."

CHARLES IV, King of Spain: b. Naples, 12 Nov. 1748; d. there, 20 Jan. 1819. He came to Madrid in 1759, when his father, Charles III, after the death of his brother, Ferdinand VI, ascended the Spanish throne, and succeeded him, 13 Dec. 1788. He married the Princess of Parma, Louisa Maria. Too imbecile in mind to govern, he was always ruled by his wife and his ministers, among whom Godoy, his wife's paramour, had unbounded influence over him. He had a due sense of his sanctity as an anointed king; and it is not known that he ever permitted to be revealed to himself the absurd position in which he was placed by the infidelity and masterfulness of his consort. The hatred which Godoy drew on himself from the grandees of the court brought on a revolution in 1808, which enabled Napoleon to dethrone the Bourbons. Charles abdicated at Aranjuez, 19 March, in favor of his son Ferdinand, who in turn was forced to abdicate by Napoleon. Charles, who had repudiated his own abdication, finally ceded, at Bayonne, his right to the throne to Napoleon, who settled on

him for life the palace of Compiègne and a pension of 6,000,000 francs. Charles after this lived at Compiègne with the Queen and her paramour, Godoy, but subsequently exchanged this residence for Rome.

CHARLES IX, King of Sweden: b. 5 Oct. 1550; d. Nyköping, 30 Oct. 1611. He was the fourth son of Gustavus Vasa and was chosen king in 1604. He fostered trade and mining, and established the University of Gothenburg, at the same time that he was subduing the turbulent nobles of the realm and forming alliances with the Protestant princes of Germany.

CHARLES X, King of Sweden: b. Nyköping, 8 Nov. 1622; d. Gothenburg 13 Feb. 1660. He succeeded his cousin, Christina, in 1654, and by his prudence and valor considerably extended his dominions, wresting Livonia from the Poles, and several provinces from Denmark. After a short reign of six years, in which he was constantly engaged in war, sometimes meeting with severe reverses, but on the whole a considerable gainer, he was fatally attacked with an epidemic then raging among his troops, and was succeeded by his son Charles. Consult Bain, R. N., 'Scandinavia' (London 1905); Haumant, E., 'La Guerre du nord et la paix d'Oliva' (Paris 1893).

CHARLES XI, King of Sweden: b. 4 Nov. 1655; d. Stockholm, 15 April 1697. He succeeded to the throne at five years of age, but the country was governed by a regency till 1672. He then put in force a system of tyrannous exaction and arbitrary oppression, by which he in a short time made himself absolute. Having once become independent of the states, he studied to appease the people by ruling with justice and impartiality. In his wars — an evil legacy from the regency — he was unsuccessful, and lost much of his father's territorial acquisitions. He founded the University of Lund, reorganized the army and navy and strengthened the finances of the country.

CHARLES XII, King of Sweden: b. Stockholm, 27 June 1682; d. Frederikshald, 11 Dec. 1718. On the death of his father, in 1697, he was declared of age by the Estates, Meanwhile the young King showed but little inclination for business: he loved violent bodily exercises, and especially bear hunting. To his jealous neighbors this seemed a favorable time to humble the pride of Sweden. Frederick IV of Denmark, Augustus II of Poland and the Czar Peter I of Russia therefore concluded an alliance which resulted in the Great Northern War (1699). The Danish troops first invaded the territory of the Duke of Holstein-Gottorp. Charles proposed in the council of state the most energetic measures against Denmark, the result of which was the discomfiture of the Danes; thus ended the first enterprise of Charles XII, in which he exhibited as much intelligence and courage as disinterestedness. He adopted at this time that severe and temperate mode of life to which he ever remained true, avoiding relaxation and useless amusements and living on the simplest fare.

After thus checking Denmark the attacks of Augustus and Peter remained to be repelled. The former was besieging Riga, the latter menaced Narva and the country situated about the Gulf of Finland. Without returning to his capital — which in fact he never revisited — Charles caused 20,000 men to be transported to Livonia, and went to meet the Russians, whom he found 80,000 strong in a fortified camp under the walls of Narva. On 30 Nov. 1700, between 8,000 and 10,000 Swedes placed themselves in order of battle, under the fire of the Russians, and the engagement began. In less than a quarter of an hour the Russian camp was taken by storm. Thirty thousand Russians perished on the field or threw themselves into the Narva; the rest were taken prisoners or dispersed. After this victory Charles crossed the Dwina, attacked the intrenchments of the Saxons and gained a decisive victory.

The war continued: the Swedes gained a brilliant victory at Clissau; in 1703 all Poland was in possession of the conquerors. At Altranstadt Charles I dictated the conditions of peace in 1706.

In September 1707 the Swedes left Saxony on a Quixotic scheme of conquest. They were 43,000 strong, well clothed, well disciplined and enriched by the contributions imposed on the conquered. Six thousand men remained for the protection of the king of Poland; with the rest of the army Charles took the shortest route to Moscow. But having reached the region of Smolensk he altered his plan at the suggestion of the Cossack hetman, Mazeppa, and proceeded to the Ukraine, in the hope that the Cossacks would join him. But Peter laid waste their country, and the proscribed Mazeppa could not procure the promised aid. The difficult marches, the want of provisions, the perpetual attacks of the enemy and the severe cold, weakened Charles' army in an uncommon degree. Poltava, abundantly furnished with stores, was about to be invested when Peter appeared with 70,000 men. Charles in reconnoitering was dangerously wounded in the thigh; consequently, in the battle of 8 July 1709, which changed the fortunes of the Swedish hero and the fate of the North, he was obliged to issue his commands from a litter without being able to encourage his soldiers by his presence. They were obliged to yield to superior force and the enemy obtained a complete victory. He himself, together with Mazeppa, fled with a small guard, and finally found refuge and an honorable reception at Bender, in the Turkish territory. The regency in Stockholm took measures for the defense of the Swedish territory. Charles meanwhile negotiated at Bender with the Porte; succeeded in removing the ministers who were opposed to him, and induced the Turks to declare war against Russia. The armies met on the banks of the river Pruth, 1 July 1711. Peter seemed nearly ruined when the courage and prudence of his wife produced a peace, in which the interests of Charles were entirely neglected. This monarch, however, projected new plans, and through his agents solicited of the Porte auxiliaries against his enemies. But the Russian agents were no less active to prepossess the Porte against him, pretending that Charles designed to make himself, in the person of Stanislaus, the actual master of Poland, in order from thence, in conjunction with the German Emperor, to attack the Turks. The seraskier of Bender was ordered to compel the King

to depart, and in case he refused, to bring him, living or dead, to Adrianople. Little used to obey the will of another and apprehensive of being given up to his enemies, Charles resolved to defy the forces of the Porte with the 200 or 300 men of which his retinue consisted, and, sword in hand, to await his fate. When his residence at Varnitza, near Bender, was attacked by the Turks he defended it against a whole army, and yielded only step by step. The house took fire, and he was about to abandon it when, his spurs becoming entangled, he fell and was taken prisoner. The Turks now removed their prisoner from Bender to Demotica, near Adrianople. Escaping in disguise he reached Stralsund on the night of 22 Nov. 1714. A combined army of Danes, Saxons, Russians and Prussians immediately invested Stralsund. Charles, during the defense, performed miracles of bravery. But being obliged to surrender the fortress, on 23 Dec. 1715, he proceeded to Lund, in Schonen, and took measures to secure the coast. He then attacked Norway. The Baron of Görtz, whose bold but intelligent plans were adapted to the situation of the Swedish monarchy, was at that time his confidential friend. His advice was, that Charles should gain Peter the Great to the interest of Sweden by important concessions, make himself master of Norway, and from thence land in Scotland, in order to dethrone George I, who had declared himself against Charles. Görtz discovered resources for prosecuting the war, and entered into negotiations at Aland with the plenipotentiaries of the Czar. Peter was already gained and a part of Norway conquered; the fortunes of Sweden seemed to assume a favorable aspect; Charles was besieging Frederikshald, when, on 30 Nov. 1718, as he was in the trenches, leaning against the parapet and examining the workmen, he was struck on the head by a cannon-ball.

At Charles' death Sweden sank from the rank of a leading power. If that King knew when to make war, he did not know when to make peace. The Great Northern War passed through three stages — a war of defense on the part of Sweden, then a war of aggression and finally a struggle for its existence as a nation. In his last years Charles formed great plans for the improvement of its navy, trade and commerce. Firmness, valor and love of justice were the grand features of Charles' character, but were disfigured by rashness and obstinacy. These defects in his character earned him the nickname of the "Madman of the North." Consult Bain, R. N., 'Charles XII and the Collapse of the Swedish Empire' (London 1895).

CHARLES XII, The History of, a famous work by Voltaire, published in 1731. It is divided into eight books, and is considered its author's historical masterpiece.

CHARLES XIII, King of Sweden: b. 7 Oct. 1748; d. 5 Feb. 1818. He was the second son of King Adolphus Frederick. Appointed at his birth high-admiral of Sweden, his education was directed chiefly to the learning of naval tactics. In 1770 he commenced the tour of Europe. The death of Adolphus Frederick recalled him to Sweden, where he took an important part in the revolution of 1772. His brother, Gustavus III, appointed him governor-general of Stockholm and Duke of Sudermannland. In the war with Russia, in 1788, he commanded the fleet, defeated the Russians in the Gulf of Finland, and, in the most dangerous season of the year, brought back his fleet in safety to the harbor of Carlscrona, after which he was appointed governor-general of Finland. After the murder of Gustavus III, in 1792, he was placed at the head of the regency, and, happily for Sweden, preserved peace with other nations, while he united with Denmark for the protection of the navigation in the northern seas. In 1796 he resigned the government to Gustavus Adolphus IV, who had become of age, and retired to his castle of Rosersberg. He did not again appear in public life till a revolution hurled Gustavus Adolphus IV, in 1809, from the throne, and placed Charles at the head of the state, as administrator of the realm, and some months afterward, 20 June 1809, as king of Sweden, at a very critical period. The peace with Russia, at Frederiksham, 17 Sept. 1809, gave the country the tranquillity necessary for repairing its heavy losses and for completing the fabric of the constitution. He had already adopted Prince Christian of Holstein-Sonderburg-Augustenburg as his successor, and after his death, Marshal Bernadotte, who was elected by the Estates, in August 1810, to take the place of the Prince. On him he bestowed his entire confidence. His prudent conduct in the war between France and Russia in 1812 procured Sweden an indemnification for Finland by the acquisition of Norway, 4 Nov. 1814.

CHARLES XIV, King of Sweden. See BERNADOTTE, JEAN BAPTISTE JULES.

CHARLES XV (LOUIS EUGÈNE), King of Sweden and Norway: b. 3 May 1826; d. 18 Sept. 1872. He was the son of Oscar I, whom he succeeded 8 July 1859. He is well known for his liberal and popular rule, his reforms in the communal, ecclesiastical and criminal branches of the law. In his reign the Storthing, or Parliament, was reconstituted and given a more representative character. He was the author of a book of poems. Consult Booth-Holmberg, 'Carl V, somenskild man, konung och Roustnär' (Stockholm 1891).

CHARLES, Elizabeth Rundle, English writer of religious stories: b. Tavistock, 2 Jan. 1828; d. London, 28 March 1896. She was married to Andrew Charles in 1851. Her books have been widely popular in England and America, the most famous of them being 'The Chronicles of the Schönberg-Cotta Family' (1863). Among her other works are 'Martyrs of Spain' (1877); 'Diary of Mrs. Kitty Trevelyan' (1865); 'The Draytons and Davenants' (1867); 'Winifred Bertram' (1866); 'Against the Stream' (1873); 'The Bertram Family' (1876); 'Lapsed But Not Lost' (1877).

CHARLES, Jacques Alexandre César, French scientist: b. Beaugency, France, 12 Nov. 1746; d. 7 April 1823. He lectured on physical science in Paris, made the first balloon using hydrogen gas and in 1783 made with M. Robert the first ascent ever made in a balloon. A height of 7,000 feet was reached on this occasion. Among his other inventions are the thermometric hydrometer and a number of optical instruments. In 1787, he anticipated Gay-Lussac's law of dilatation of gases.

CHARLES, Robert Henry, Irish theologian and scholar: b. County Tyrone, 6 Aug. 1855. He was educated at Queen's College, Belfast, and Trinity College, Dublin, and was admitted to the Anglican priesthood in 1883. He was curate of Saint Mark's, Whitechapel, 1883–85; of Saint Philip's, Kensington, 1885–86; and of Saint Mark's, Kennington, 1886–89. From 1898–1906 he was professor of biblical Greek at Trinity College, Dublin; Grinfield lecturer on the Septuagint, Oxford, 1905–11; Speaker's Lecturer in Biblical studies, Oxford, 1910–14; and has been canon of Westminster since 1913. He has published 'Forgiveness, and Other Sermons' (1886); 'Book of Enoch Translated From the Ethiopic' (1893); 'Ethiopic Text of Book of Jubilees' (1894); 'Book of the Secrets of Enoch' (1895); 'The Assumption of Moses' (1897); 'The Doctrine of a Future Life' (2d ed., 1913); 'Studies in the Apocalypse' (1913); 'Religious Development between the Old and the New Testament' (1914); and made numerous contributions to encyclopædias and educational works.

CHARLES ALBERT, King of Sardinia; b. 2 Oct. 1798; d. Oporto, Portugal, 28 July 1849. He was the son of Charles Emmanuel, Prince of Savoy-Carignan. He was educated in France, and in 1831 succeeded to the throne as the nearest heir on the death of Charles Felix. In the first years of his reign he showed himself favorable to the cause of progress by promoting a number of beneficial reforms. Subsequently, indeed, he became more absolute in his views, but after the French Revolution of February 1848, he granted a constitution, and took the field against Austria on behalf of the revolted peoples of the Lombardo-Venetian kingdom and the duchies of central Italy. His arms were at first very successful, the Austrians were defeated in various encounters: but he was at last repulsed by Marshal Radetsky and obliged to sue for an armistice. On its expiration he resumed hostilities, but the battle of Novara, fought on 23 March 1849, proved fatal to the aspirations of Charles Albert and Sardinia. That very day he abdicated in favor of his son, Victor Emmanuel II, afterward King of Italy, and retired to a monastery at Oporto, in Portugal. Consult Capelletti, L., 'Storia di Carlo Alberto' (Rome 1899); Masi, E., (Il Segreto del Re Carlo Alberto' (Bologna 1891).

CHARLES OF ANJOU, King of Naples and Sicily, the son of Louis VIII of France: b. about 1220; d. Foggia, 7 Jan. 1282. He waged war on King Manfred of Sicily, who was defeated and slain. He then seized on the Neapolitan crown (1266). His cruelty and exacting rule induced such a detestation of the French name, that the Sicilians, headed by John de Procida, rose in arms on the eve before Easter Day, 1282, and slaughtered all the French in the town and neighborhood of Palermo, the signal for the rising being the tolling of the vesper-bell; this tragedy is hence recorded in history as the "Sicilian Vespers" (q.v.). By this act the French were entirely expelled from the island. Charles was unsuccessful in subsequent projects against the island.

CHARLES AUGUSTUS, Grand Duke of Saxe-Weimar: b. 3 Sept. 1757; d. Graditz, Prussia, 14 June 1828. His mother, Amalia, reigned as regent for him until he succeeded to power in 1775. He was a general in the army of Prussia 1772–93, and with the allies opposed Napoleon 1813–15. By the Congress of Vienna his principality was made a grand duchy. He liberally patronized science and art, and under him his capital of Weimar became the literary centre of Germany. He was a close friend of Goethe.

CHARLES THE BALD. See CHARLES I of France.

CHARLES THE BOLD, Duke of Burgundy: b. Dijon, 10 Nov. 1433; d. Nancy, 5 Jan. 1477. He succeeded to the dukedom in 1467, and immediately engaged in a war with the citizens of Liége, whom he conquered and treated with extreme severity. Before this undertaking he had been obliged to restore to the citizens of Ghent the privileges which had been taken from them by Philip the Good. He now revoked his forced concessions, caused the leaders of the insurrection to be executed and imposed a large fine on the city. In 1468 he married Margaret of York, sister of the king of England. Learning that the inhabitants of Liége, instigated by King Louis XI, had rebelled anew, and made themselves masters of Tongres, he compelled the King to sign a treaty the most disgraceful condition of which was that he should march with Charles against the city of Liége, which he had himself excited against the Duke. Charles encamped before Liége in company with the King; the city was taken by storm, and abandoned to the fury of the soldiers. Such success rendered the mind of the Duke utterly obdurate, and added the last traits of that inflexible, sanguinary character which made him the scourge of his neighborhood, and led to his own destruction. Edward IV conferred on him in 1470 the Order of the Garter. Shortly after he received in Flanders Edward himself, who came to seek an asylum with the Duke. Charles gave him money and ships to return to England.

About the end of the same year the war between the King of France and the Duke of Burgundy was renewed, and never did Charles show himself more deserving of the name of the "Bold" or "Rash," than in this war.

Having completed the conquest of Lorraine by the taking of Nancy in 1475, he turned his arms against the Swiss; and notwithstanding the representations of these peaceful mountaineers, who told him that all that he could find among them would not be worth so much as the spurs of his horsemen, he took the city of Granson, and put to the sword 800 men, by whom it was defended. But these cruelties were soon avenged by the signal victory which the Swiss obtained near the same city 3 March 1476.

With a new army he returned to Switzerland, and lost the battle of Murten (Morat) 22 June. The Duke of Lorraine, who had fought in the army of the Swiss, led the victors to the walls of Nancy, which surrendered 6 October. At the first information of this siege Charles marched to Lorraine, to retake the city of Nancy from the Duke René. On 5 or 6 Jan. 1477 the two armies met: the wings of the Burgundian army were broken through and dispersed, and the centre, commanded by the Duke in person, was attacked in front and

flank. As Charles was putting on his helmet, the gilded lion which formed its crest fell to the ground, and he exclaimed with surprise, *Ecce magnum signum Dei!* Defeated, and carried along with the current of fugitives, he fell, with his horse, into a ditch, where he was killed by the thrust of a lance. His body, covered with blood and mire, and with the head embedded in the ice, was not found till two days after the battle, when it was so disfigured that for some time his own brothers did not recognize it. See Kirk, 'History of Charles the Bold' (1863–68). In 'Quentin Durward,' Sir Walter Scott has portrayed the character of Charles, and some of the quarrels between him and Louis of France.

CHARLES CITY, Iowa, city and county-seat of Floyd County, on Cedar River, 40 miles northwest of Cedar Falls, and on the Illinois Central and the Chicago, Milwaukee and Saint Paul railroads. It is supplied with good water power by the river and has a number of manufacturing interests, including stove fixtures, furniture, sashes and doors, harrows and gasoline traction and stationary engines. Live stock, poultry, dairy products and nursery stock are the chief items of trade. It is the seat of Charles City College, a coeducational institution, organized in 1891, under the auspices of the German Methodist Church, which had 246 students at the end of 1910. It contains an opera-house, public library, a home for the aged and several parks. It was settled in 1856, incorporated in 1869 and is governed by a mayor and council. The waterworks are the property of the municipality. Pop. (1910) 6,892.

CHARLES CITY CROSS-ROADS, Battle of. See GLENDALE, BATTLE OF.

CHARLES EDWARD STUART. See STUART, CHARLES EDWARD LOUIS.

CHARLES EMMANUEL I, Duke of Savoy, surnamed "the Great": b. Rivoli, 12 Jan. 1562; d. Savigliano, 26 July 1630. He formed (1590) the plan of uniting Provence to his dominions. Philip II of Spain, his father-in-law, obliged the Parliament of Aix to acknowledge him as the protector of this province, in order by this example to induce France to acknowledge the king of Spain as protector of the whole realm. The Duke of Savoy, not less ambitious, likewise aimed at this crown, and after the death of Matthias desired also to be chosen emperor of Germany. He likewise intended to conquer the kingdom of Cyprus, and to take possession of Macedonia, the inhabitants of which, oppressed by the Turks, offered him the sovereignty over their country. The citizens of Geneva were obliged to defend their city in 1602 against this ambitious prince, who fell upon them by night in time of peace. Henry IV, who had reason to complain of the Duke, and whose general, the Duke of Lesdiguières, had beaten Charles Emmanuel several times, entered at last into a treaty of peace with him, not disadvantageous to the Duke of Savoy. In 1628 he joined Spain in the war against France and his territory was left to him to support unaided by his ally. He died when this struggle had all but exhausted his army's strength.

CHARLES THE FAIR. See CHARLES IV of France.

CHARLES THE FAT. See CHARLES II of France.

CHARLES FRIEDRICH AUGUST WILHELM, Duke of Brunswick: b. 30 Oct. 1804; d. 1873. He succeeded to the dukedom in 1823, but his rule was so arbitrary and oppressive that the German Diet deposed him. He subsequently lived in Paris and London, and at his death bequeathed his vast fortune to the city of Geneva.

CHARLES MARTEL, King of the Franks: b. about 688; d. 22 Oct. 741. He was a natural son of Pepin Héristal, mayor of the palace under the last kings of the Merovingian dynasty. On the death of his father in 714, Charles was thrown into prison, but managed to escape, and gradually made himself master of a greater part of the country of the Franks. By establishing unity in Gaul he saved it from the danger of conquest by the Arabs who had already taken possession of most of Spain. In 732 Charles gained a decided victory over Abd-ur-Rahman, the Arab leader, who had undertaken to conquer France. He extended his influence over Frisia, the Germanic tribes, Saxony, Bavaria and neighboring races. He organized the nobility and the knights into great bodies, under effective discipline of a military character; and the favors he extended to them to gain his ends had a strong effect on the creation and future growth of the feudal system. Charles Martel was a man of activity, courage and far-sightedness and, though his political schemes failed in the end, yet his work had a vast influence upon the future of southern and western Europe.

CHARLES D'ORLÉANS, shärl'dor-lā-än', French nobleman and poet, son of Louis d'Orléans: b. 26 May 1391; d. 4 Jan. 1465. He was the grandson of Charles V of France, and the father of Louis XII. He was taken prisoner at Agincourt, and kept in captivity in England from 1415 to 1440, when he was ransomed. He wrote a number of lyrics while in prison and after his return to France. At Blois, where he held his court, he gathered together the chief French writers of his time, and took part with them in poetical tournaments, in one of which François Villon competed successfully. He has been termed the father of French lyric poetry, but has no claim to the title. His light and graceful lyrics are the last flowering of the courtly poetry of the Middle Ages; they show no trace of the modern spirit which appears so strongly in the works of his contemporary, Villon. His favorite themes are love and the springtime; his favorite form is the rondel, with two rhymes, of which he is considered the chief master, as Villon is of the ballade and Voiture of the rondeau. His works were edited by D'Héricault (1874), with memoir. Consult Beaufils, 'Etudes sur la vie et les poésies de Charles d'Orléans' (2 vols., Paris 1875) and Stevenson, R. L., 'Familiar Studies of Men and Books' (1882).

CHARLES RIVER, a river in Massachusetts, which flows into Boston harbor, dividing Boston from Charlestown. The source of the principal branch is a pond bordering on Hopkinton. It is navigable for

lighters and large boats to Watertown, seven miles west of Boston. The chief towns on its banks are the Newtons, Waltham, Watertown, Cambridge, Brookline and Boston.

CHARLES THE SIMPLE. See CHARLES III of France.

CHARLES TOWN, W. Va., town and county-seat of Jefferson County, situated on a branch of the Baltimore and Ohio Railroad, 10 miles southwest of Harper's Ferry. It is the centre of an agricultural region, has deposits of limestone and iron ore in the vicinity, and manufactures brass fittings, harness, collars, fly nets, various wooden products and fertilizers. It was settled about 1750 and was first incorporated in 1873. It was here that John Brown, after his raid at Harper's Ferry, was tried, condemned and hanged on 2 Dec. 1859. On 18 Oct. 1863, a Confederate cavalry division, under General Imboden, captured the place and secured 424 prisoners and large quantities of military stores, but, on the approach of a superior Union force, almost immediately withdrew. Pop. 2,662.

CHARLES'S WAIN, a common name for the constellation of the Great Bear or Ursa Major. Originally instead of Charles's Wain, the name was "carl's" or "churl's wain," meaning the farmer's wagon. Since the time of Homer this constellation has been called a wagon; but since the 17th century the name has been associated with Charles I and Charles II. Shakespeare calls it Charles's Wain.

CHARLES THE WISE. See CHARLES V of France.

CHARLESTON, Ill., county-seat of Coles County, situated at the junction of the Cleveland, Cincinnati, Chicago and Saint Louis and the Toledo, Saint Louis and Western railroads. It is the centre of a large oil, gas and coal region, and 49 miles southeast of Decatur. It has manufactories of woolen goods, carriages, stoves, plows, brooms and also flour mills, banks, good schools and several churches. It is the seat of the Eastern Illinois Normal School, and contains a Carnegie library. Charleston was settled in 1830, and incorporated in 1855. The government is vested in a mayor, chosen for two years, and a council. The waterworks are municipally owned. Pop. 5,884.

CHARLESTON, Mo., city and county-seat of Mississippi, 15 miles southwest of Cairo, Ill., on the Saint Louis, Iron Mountain and Southern Railroad. It has a large trade in grain, flour, fruits, live stock and potatoes. It contains flour mills, saw mills, axe handle factories and stave and barrel heading works. Indian mounds are numerous in the vicinity. The city owns the waterworks. Pop. 3,144.

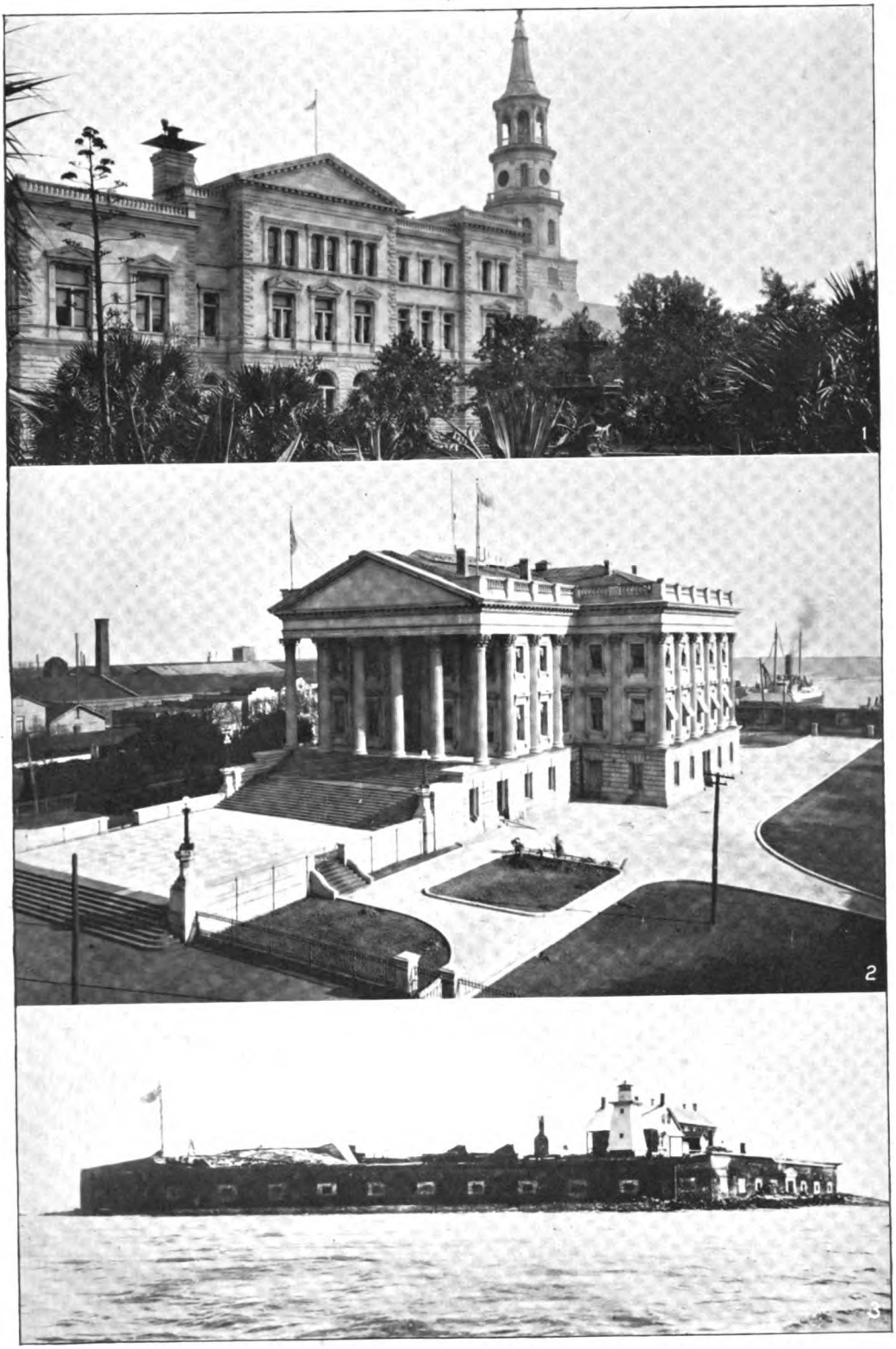
CHARLESTON, S. C., the chief city of the State, and most important on the Atlantic seaboard south of Chesapeake Bay, seat of Charleston County: 130 miles southeast of Columbia, the capital, and 82 miles north of Savannah. Railroad service includes Atlantic Coast Line and connections (Charleston & W. Carolina; Georgia Railroad; Cola., N. & L.; Winston-Salem Southbound; N. C. & St. L.; L. & N.)—Southern Railway and connections (Q. C. and Georgia Railroad)—and Seaboard Air Line and connections.

Charleston lies on a peninsula, 10 or 12 miles long and 8 or 10 feet above high water, between the navigable Ashley and Cooper rivers, 2,100 yards and 1,400 yards wide respectively at the mouth; the latter reinforced by the Wando at the city, and the estuary of the three forming a magnificent landlocked harbor, six miles long by three wide, with 40 feet of water at the city—one of the finest, safest and most spacious on the Atlantic Coast.

The harbor's channel, lying for some distance between jetties, is 700 feet wide and has a mean depth at low water of 28 feet and at high water of 33 feet. There are about 17 miles of available waterfront, with development constantly in progress on both the Ashley and the Cooper rivers. During the years 1910 to January 1916, for example, wharfage and terminal improvements costing nearly $5,500,000 were made. Ocean traffic has been quick to take advantage of the several large inducements held out by Charleston and now its steamship service includes Clyde Steamship Company (Boston, New York, Jacksonville); Baltimore & Carolina SS. Company (Baltimore, Georgetown); Philadelphia & New Orleans SS. Company (Philadelphia, New Orleans); Southern Transportation Company (barge line, Philadelphia, Baltimore, Norfolk, Wilmington, Georgetown); American-Hawaiian SS. Company (West Coast U. S.); Luckenbach SS. Company (contract service, West Coast, South America); Grace Line (contract service, West Coast, South America); Carolina Line (contract European service); United Fruit Company (port of call); Sea Island Steamboat Company (Charleston, Beaufort).

The resemblance of Charleston's position to that of New York in its rivers and harbors is striking. Freight here is moved directly from vessel to freight cars, or vice-versa, without lightering or trucking. Distances from the Central West to Charleston are not great and the city has just entered upon a period of relationship with the Central Western cities and manufacturing points that promises to make of Charleston the port of export and import for all these cities and manufacturing points. From a military and naval viewpoint, Charleston's position is of supreme importance to all the Southeast. In 1,728 miles of coast line, from Cape Hatteras to the mouth of the Rio Grande, it has the only United States navy yard. Also, it is the only place on the South Atlantic and Gulf coasts with a dry dock large enough to repair a battleship. The city is only seven and one-half miles from the ocean and the channel is easily mined and is protected by forts Sumter and Moultrie. It is located directly north of the Panama Canal, from which its sailing distance is only 12 per cent greater than that from New Orleans. It has the only large coaling terminals on the coast and is the distributing point for the Carolinas of two of the greatest oil companies. Admirals of the navy have repeatedly pointed out its wonderful strategic advantages and its practical impregnability. The Charleston navy yard is to-day in a high state of efficiency, employing more than 4,500 people and paying civilian wages of more than $5,000,000 annually. Charleston, at the time of America's entrance into the World War, became the headquarters of the Southeastern

CHARLESTON, S. C.



1 Post Office, with St. Michael's, Charleston's Oldest Church, in the Distance
2 United States Customs House
3 Fort Sumter

Military Department and of the Sixth Naval District.

Trade and Commerce.— At the outbreak of the Civil War, Charleston's export trade in cotton, rice and naval stores made up the largest part of a total of about $17,000,000 annually. The war reduced this to almost nothing. The work of repairs to docks, wharves and railroads was slow and it is only in recent years that Charleston has recovered from her tremendous losses and has begun to forge ahead rapidly. Recent years, however, have witnessed strides that are record-breaking, as seen in the statistics for 1903 and 1913: Foreign imports, (1903) $1,768,000, (1913) $5,361,000; coastwise imports, (1903) $10,315,000, (1913) $22,040,000; foreign exports, (1903) $3,468,000, (1913) $20,783,000; coastwise exports, (1903) $32,107,000, (1913) $31,040,000; total exports and imports, (1903) $47,659,000, (1913) $79,225,000. The rate of increase since then has been even greater, the total commerce for 1915 being $222,881,814, and that for 1916 being $320,048,883. The principal exports are cotton, cotton goods, lumber, fertilizers, cigars and tobacco, fruits and vegetables. Charleston is the centre of the second most important trucking district of the country and is the shipping point for the products of this district. In recent years, the completion of the Panama Canal and freight rate adjustments have made the merchants of Charleston begin to look to the Middle West for a large export trade in manufactured articles. Charleston's wholesale business in 1915 amounted to $30,801,484. Coal terminals costing $600,000 were constructed in 1915 and others to cost an equal amount are now under construction. These terminals and rate adjustments have made Charleston the most important coaling port on the South Atlantic and the outlet for some of the largest coal fields. There have recently been installed two large fuel oil tanks, each of 700,000 gallons capacity, making this the most important oil supply and distribution point between Baltimore and New Orleans. The government is now constructing terminals to cost between twenty and thirty millions dollars at North Charleston for both war and peace uses.

Manufactures.—Charleston's principal enterprises embrace fertilizers, lumber and timber, mineral waters and soda, bakeries, textiles, foundries and machinery, printing and publishing, tobacco and cigars and flour and grist. There are also important manufactories of carriages and wagons, ice, medicine and rugs, baskets, boxes and furniture. The most important manufacture is fertilizer, with lumber second and textiles third. Manufacturing statistics for 1917 are as follows: Plants, 190; capital, $29,268,513; annual products, $36,663,945; salaried persons, 801; wage earners, 14,437; paid in salaries and wages, $10,383,087.

As a distributing and wholesale point, Charleston is pre-eminent in its section. Wholesale establishments number 89, employing 1,528 wage earners. They pay wages and salaries of $1,135,602 and do an annual business of $30,801,484. Principal lines are groceries, cement, lime and plaster, drugs, dry goods and notions, flour, fruit and produce, machinery and mill supplies, provisions, rice and shoes.

Buildings, Streets, Suburbs, etc.— Charleston's long existence for an American city (founded 1670) and its position of leadership in all political movements as well as vital importance in war time give it rich historical interest; and this, with its fine climate and its old garden-set mansions and outlying garden spots of rare beauty, make it one of the choicest and most popular Southern tourist resorts. In summer it attracts large numbers of visitors by reason of its beach resort, the Isle of Palms, where the scenes of Poe's 'Gold Bug' are said to have been laid.

Charleston is unique among American cities in that while keeping up with the most modern in commercial and industrial progress, it has preserved all its historic places and features. Within its gates the student of history is presented opportunities to study every period in American life from 1700 to the present time. The city is laid out generally at right angles, but with some picturesque irregularities in the streets; four of these, King street, the principal retail thoroughfare, Meeting street, the principal wholesale and distributing thoroughfare, and Rutledge and Ashley avenues, run the entire length of the city, north and south. King street ends in White Point Garden, a handsome wooded park containing monuments to Sergeant Jasper and his comrades and to William Gilmore Simms; the old gun from the *Keokuk*, the Phosphate Monument and a drinking fountain to the heroes of the *Hunley* who lost their lives in Charleston Harbor on the first submarine boat ever built in America. White Point Gardens, with its adjacent esplanade, the Battery, 1,500 feet long, is Charleston's greatest pride and beauty. The Battery gives a magnificent view of the harbor and the forts. In the middle distance stands Fort Sumter; to the right the shores of Morris, James and John's islands, on which are located the lighthouse and United States quarantine station, and where formerly stood Fort Johnson, Battery Wagner and Cummings Point; in the distance to the left, the houses of Mount Pleasant, Sullivan's Island and the Isle of Palms, suburbs and beach resorts; nearer still, Castle Pinckney, on its little marsh island in the Cooper, and Fort Ripley. Adjoining the Battery is a development of recent years called the Boulevard. This is a section of land filled in from the river at a cost of about $400,000 and fronted by a beautiful walk and drive 4,000 feet long. This, with the Battery, gives a continuous waterfront esplanade of 5,500 feet or more than a mile.

Going north from the Battery, one finds at the juncture of Meeting and Broad streets several large public buildings. They are the county courthouse, a solid brick building; the city hall, an imposing structure entered by a double flight of steps and containing valuable paintings and relics; the United States post-office, a four-story, $500,000, modern office building of Carolina granite, reputed to be the "cleanest Federal building in the country," and Saint Michael's Church, the central point of all Charleston's historical associations. The United States custom house, near Market wharf on the Cooper River, is a superb structure of white marble costing some $3,400,000. In front of the city hall is Washington Park or City Hall Park, containing a statue of William Pitt, erected before the Revolution — the British shot off one of the arms in 1780 — and monuments to the Confederate dead, to General

Beauregard, and a bust of Henry Timrod, the Charleston poet. Nearby is the old post-office building, where Washington and LaFayette were entertained, where Steve Bonnet and other pirates were imprisoned, where the forbidden tea imports were stored and whence the patriot Isaac Hayne was led to his execution by the British. The Charleston Chamber of Commerce, which is nearby, was founded in 1773 and is the second oldest civic and commercial body in America and the oldest city Chamber of Commerce.

Going northward from the city hall one comes upon the Gibbes Memorial Art Gallery and, on the street west of it, the Charleston Library, both handsome buildings. Other interesting public buildings are South Carolina hall (1804), Charleston orphan house (1794), Hibernian hall (1799), the old Powder magazine (1705), the Slave market, the old Charleston market (1841); and such residences as the Pringle house, built in 1765; the old Heyward house, in which Washington was entertained for a week in 1791; the Huger residence, in which Lord William Campbell, last colonial governor of South Carolina, resided; the William Washington house and the Horry house. In addition to the Battery and Washington Park, Charleston's parks include Marion Square, or "Citadel Green," containing a statue of John C. Calhoun and other interesting objects; Hampton Park, with sunken gardens and a wealth of Southern foliage; Colonial Lake and Common; Hampstead Mall and Cannon Park.

Charleston has one of the best electric street railways in the country, covering the city completely and running to the navy yard, seven miles distant, and to North Charleston, a suburban development which is being built into a model city along scientific lines. A ferry line gives transportation across the river to Mount Pleasant, a suburb, and thence an electric railway runs through Sullivan's Island, where is to be found Fort Moultrie, and finally to the Isle of Palms, Charleston's beach resort, that boasts a beautiful white sand beach nine miles long, cottages, a large pavilion and other resort features. Magnolia Gardens, 12 miles west on the Ashley, are perhaps the principal attraction for beauty-lovers who visit Charleston. They are among the world's famous gardens, having been begun by one of the Draytons generations ago. Summerville, 22 miles north of Charleston, is a summer resort for Southern people and a fashionable winter resort for those of the North. Magnolia Cemetery is Charleston's largest and most beautiful burial place. A new cemetery of large proportions has been opened, however — the Riverview. Charleston has a new and thorough system of drainage which further improves the fine sanitary condition for which the city has been noted.

Education.— The public-school system, established in 1810, had, in 1914, eight school buildings. For all primary and preparatory education, public and private, the statistics are: 20 institutions, 241 teachers, 7,818 pupils, buildings valued at $463,500, annual expenditures of $291,324. For higher education the principal institutions are College of Charleston, chartered in 1785; the Military College of South Carolina, a State institution, established in 1845, one of the foremost military schools in the country and famed for the active part its students took in the Civil War; the Medical College of South Carolina, a State institution ranking in Class A of the American Medical Association; Porter Military Academy, Charleston High School, Memminger High and Normal School, Academy of Our Lady of Mercy, Confederate College, Ashley Hall, Avery Normal Institute, Wallingford Academy for Colored Youth and many private academies and schools. The Charleston Museum, the oldest museum on the American continent, having been founded in 1773, is also one of the most complete and well-rounded collections outside the largest cities. In addition to its collecting and exhibition work, it works with the public and private schools of the city.

Churches and Charitable Institutions.— Charleston is truly a city of churches, there being 81 (42 white and 39 colored), divided among the Adventist, Baptist, Christian, Christian Science, Congregational, Episcopalian, French Protestant, Greek Orthodox, Hebrew, Lutheran, Methodist, Presbyterian, Roman Catholic and Unitarian denominations among the white churches and Baptist, Congregational, Episcopal, Methodist, Presbyterian and Roman Catholic among the colored. The leading denominations are Episcopalian, Lutheran and Roman Catholic. It is the home of the Episcopal bishop of South Carolina and also of the Roman Catholic bishop. It has a Roman Catholic cathedral, that of Saint John the Baptist. The oldest church building is Saint Michael's (Protestant Episcopal), dating from 1761, with a fine chime, of interesting history, and numerous associations that make it the most famous church in South Carolina; the oldest organization is that of Saint Philip's (Protestant Episcopal), whose building was burned in the great fire of 1835, after having been saved from two earlier fires, and whose present one is a classic structure of great beauty and originality, with a steeple nearly 200 feet high, bearing at night a beacon, visible far out at sea; and with a churchyard full of distinguished names, including Calhoun, Gadsden, Rutledge and Pinckney. The Circular (Congregational) Church is noted, while the Old Huguenot Church is the only congregation of its kind in the United States. Other churches of interest are Grace (Protestant Episcopal), the Scotch, the Second and Westminster Presbyterian; Citadel Square (Baptist) and First (Baptist); Unitarian; Bethel and Trinity (Methodist); the Hasell Street Synagogue (Hebrew); Saint Matthew's (Lutheran); Saint Mary's (Catholic).

Of the charitable organizations and institutions, the most important are the Orphan House, founded 1792, the oldest of its kind in the United States; the Euston Home for the Aged; Home for Mothers, Widows and Daughters of Confederate Soldiers; the Roper Hospital; the almshouse; the Old Folks' Home for Aged Colored People; the Shirras Dispensary. Among charitable societies are Associated Charities; Ladies' Benevolent Society, organized 1813; Ladies' Fuel Society; Saint Andrew's Society, founded by Scotchmen in 1720, the oldest society in the city; Hebrew Benevolent Society, and the South Carolina Society, founded by Huguenots in 1736, renamed

from the Two-Bit Club, so called from the sum contributed by each member at each meeting for the relief of their own indigent.

Charleston's Young Men's Christian Association will compare favorably with that in any city of its size. It occupies a building costing $157,000, contributed by the people of the city. There is also an active Young Women's Christian Association in the city, with a handsome new building under construction.

Banks.— In Charleston there are 19 national savings and State banks, with aggregate capital and surplus of $5,077,899, resources of nearly $40,367,069, and deposits of $31,002,632. The city's annual bank clearings are more than $175,000,000. Charleston also has in active operation building and loan associations with aggregate capital amounting to between $2,000,000 and $3,000,000.

Government and Finances.— The government is, by the charter of 1836: a four-years' mayor and a council elected half by wards and half at large. The administrative boards and officials are partly appointive by the mayor and partly elective by the council. The city expenses are about $600,000 a year, of which $60,000 each goes for schools and charities, $75,000 for police and $50,000 for the fire department. The net debt in 1910 was $4,086,500; the assessed valuation of all taxable property, $18,824,978, of which $12,400,000 is real estate; the city tax rate is $27.80 per $1,000, besides a school tax of $1 and a State and county tax of $10.62½.

Population.— In 1790, the first census, 16,359; 1800, 18,924; 1810, 24,711; 1820, 24,780; 1830, 30,289; 1840, 29,261; 1850, 42,985; 1860, 40,522; 1870, 48,956; 1880, 49,984; 1890, 54,955; 1900, 55,807; 1910, 58,833; 1916, 72,000; 1918, 81,807.

History.— The first settlement in South Carolina was made at Port Royal by the French, in 1562; it was not successful, but they never forgot the experiment or their favor for the region. In 1670 an English colony under Gov. William Sayle made for Port Royal also; but on the advice of the cacique of Kiawah (the then name of the Ashley), settled instead at Albemarle Point, on the west bank of the Kiawah, three miles from the present site,— fortunately, as the colony Lord Cardross planted at Port Royal was exterminated by the Spaniards in 1686. The settlement was named Charles Town after Charles II. Within two years the settlers had discovered that Oyster Point, the end of the Charleston peninsula, was a better site, and within 10 years later had become the main settlement and the offices were removed there. The first village was on the Cooper entirely, as the main business still is. The commerce even at this early date was lively, 16 vessels sometimes discharging at once. In 1685–86 a colony of Huguenot refugees settled there and built a church: this strain has deeply molded Charleston and South Carolina, and its fiery zeal in heading every political movement is perhaps due to this quick French blood. In 1704 there were five churches: Saint Philip's, the Huguenot, the First Baptist, a Presbyterian and Congregational meeting-house and a Quaker one. In August 1706 an allied French and Spanish fleet attacked it, but were driven off by a small improvised fleet under Lieutenant-Governor Rhett; shortly afterward another French vessel, unaware of the others' defeat, came up and landed a party, which was routed with heavy loss, and the survivors, with the ship and the rest of the marines, captured. The city at this time was desolated with yellow fever, but this militia action counts among the brilliant feats of the War of the Succession. In 1755 a colony of 1,200 deported Acadians settled there, still further reinforcing the French element. In 1773, Josiah Quincy of Boston writes in his diary that the town was "beautiful and in many respects magnificent"; and "far surpassed everything he ever saw or expected to see in America." It was at this time the third seaport in size in America, and in 1774 established a chamber of commerce. It was not only the first Southern city to join the Revolutionary movement, but was the prime agent in bringing about the first provincial congress 10 years before; it held the first constitutional convention in any colony in March 1776, and promulgated an independent constitution. On 28 June the British fleet, under Sir Peter Parker, besieged the city, and was beaten off with terrible loss by the garrison of Fort Moultrie behind an improvised palmetto fortification. In 1779 a second attack under Gen. Augustine Prevost was defeated. But on 12 May 1780 Sir Henry Clinton captured it and its garrison under General Lincoln, after a six weeks' siege; it was not reoccupied by the Americans till 14 Dec. 1782. In 1783 it was incorporated as a city, and remained the capital of South Carolina till 1790. In 1784 it exported the first bale of cotton sent from the United States to Europe. In 1793 some 500 French refugees from the massacres of San Domingo settled there. It was the heart of the Nullification movement in 1832, as of all movements to oppose Federal authority first and last; and the Breckenridge convention of 1860 met here before adjourning to Baltimore. The convention which proclaimed the State's secession from the Union was held here 20 Dec. 1860. The Civil War was begun by its bombardment and capture of Fort Sumter on 12–13 April 1861; and from 7 April 1863 on, for nearly two years, the fort was incessantly besieged and steadily bombarded by the Union fleet, for the last 18 months it being only a heap of ruins, but impregnable. On 17 Feb. 1865, on the surrender of Columbia, Hardee evacuated the city and burned all public buildings, stores and shipping, and the next day Foster and the Union forces took possession. Despite its devastation and wreckage, it grew 21 per cent from 1860 to 1870, while it had fallen off in the previous decade,— a curious phenomenon. In 1886, on 31 August, the heaviest earthquake ever recorded in the United States destroyed several hundred buildings, and made three-fourths of the whole uninhabitable, killed scores of people and caused a property damage estimated at $8,000,000. On 2 Dec. 1901 the South Carolina Interstate and West Indian Exposition was inaugurated in the city. The year 1906 saw Charleston beginning the era of modern business and commercial prosperity upon which she is now fully launched. In the 10 years that have passed since then, the city has grown faster than in 25 or 30 years before. It has now assumed its position as the leading seaport city of the South

Atlantic and the most important military point between the Chesapeake and the mouth of the Rio Grande. Her people have been filled with a great faith in her future and are leaving no stone unturned to make their city as great in the America of the future as she was in that of the past.

For a compact sketch of its history, consult Yates Snowden in Powell's 'Historic Towns of the Southern States' and Mrs. Ravenell's, 'Charleston, the Place and the People'; in connection with State history, McCrady's three volumes of South Carolina history, 1897–1901.

SIDNEY RITTENBERG,
Charleston Chamber of Commerce.

CHARLESTON, S. C., Attacks on. In May 1776 a British squadron under Peter Parker with troops under Sir Henry Clinton (q.v.) sailed to reduce South Carolina, on 1 June anchoring off Sullivan's Island (q.v.), near Charleston. The city had been put in a state of defense by Gens. John Armstrong, Charles Lee and Robert Howe (qq.v.) and Fort Moultrie (q.v.) on Sullivan's Island had been strengthened and garrisoned by 435 troops under Col. William Moultrie (q.v.). On 28 June the fleet opened fire and troops were sent to flank the fort but its defenders replied so vigorously that the fleet was compelled to retire and the troops were unable to reach the rear. A few days later the squadron set sail for New York. Consult Gordon, William, 'American Revolution' (Vol. II); Drayton, W. H., 'Memoirs of the Revolution' (Vol. II); Moultrie, William, 'Memoirs of the Revolution' (Vol. I); McCrady, Edward, 'South Carolina in the Revolution' (p. 137 et seq.); Ramsay, David, 'History of the Revolution' (Vol. I); Sparks, Jared, 'Correspondence of the Revolution' (Vol. II, pp. 494–505); Wiley and Rines, 'The United States' (Vol. II, pp. 404–07). In December 1779 Sir Henry Clinton sailed from New York and on 11 Feb. 1780 landed about 30 miles south of Charleston. With reinforcements from New York and Savannah, he had about 13,000 troops, to oppose which Gen. Benjamin Lincoln (q.v.) had about 2,000 regulars and 1,000 militia, besides residents. On 9 April the fleet passed Fort Moultrie and Clinton established his batteries before the city, dispatching small expeditions to cut off communication with the interior. On 21 April Lincoln offered to capitulate, but Clinton rejected his terms, on 7 May captured Fort Moultrie, then threatened to assault the city and finally compelled Lincoln to capitulate, 12 May. More than 5,000 persons were captured besides 400 pieces of artillery, large quantities of stores, a number of small American frigates and two French vessels. This paved the way for Cornwallis' operations against Gates, culminating in the battle of Camden (q.v.). Consult McCrady, 'South Carolina in the Revolution' (p. 427 et seq.); Sparks, 'Correspondence of the Revolution' (Vol. II, p. 401 et seq.); Ramsay, 'History of the Revolution' (Vol. II); Gordon, 'American Revolution' (Vol. III); Lossing, 'Field-Book of the Revolution' (Vol. II); Tarleton, Banastre, 'History of the Campaigns of 1780–81 in the Southern Provinces of North America'; Stedman, Charles, 'American War' (Vol. II); Moultrie, 'Memoirs' (Vol. II); Wiley and Rines, 'The United States' (Vol. III, pp. 187–92).

CHARLESTON, W. Va., city, capital of the State and county-seat of Kanawha County, at the junction of the Kanawha and Elk rivers, on the Chesapeake and Ohio, the Ohio Central, the Kanawha and Michigan and the Charleston, C. and Sutton railroads, 130 miles south by west of Wheeling. It is an important commercial, lumber and coal-mining centre, with steamer communications with all Ohio and Mississippi River ports. In 1910 it contained 63 manufacturing establishments, valued at $2,824,882. It has extensive salt springs, State house, custom house, hospital and opera-house, three national banks and several daily and weekly newspapers. Pop. 22,996.

CHARLESTOWN, Mass., since 1874 a part of the municipality of Boston, previously a separate city and seaport. One of the chief navy yards in the United States, occupying an area of about 100 acres, is in the southeast part of Charlestown. It was settled as early as 1629, and in 1634 became a town, its original territory being considerably larger than at present, having been divided up to form the towns of Woburn, Malden, Stoneham, Burlington and Somerville, and parts of Medford, Cambridge, Arlington and Reading. It was the scene of stirring events in the Revolutionary War. The battle of Bunker Hill was fought here 17 June 1775, when the British set fire to the town, destroying 320 buildings, valued at $525,000. The battle is commemorated by a monument. Charlestown was the home of John Harvard, the earliest benefactor of Harvard University, and the birthplace of Samuel F. B. Morse, the inventor of the electric telegraph. It had a population of 23,373 at the time of its annexation to Boston. Consult Sawyer, 'Old Charlestown' (1902).

CHARLESTOWN, South Africa, a town of the extreme north of Natal, on the railway from Durban to Johannesburg. It stands at a height of over 5,300 feet. Majuba Hill is four miles distant.

CHARLET, shär-lā, **Nicolas Toussaint,** French painter and engraver: b. Paris, 20 Dec. 1792; d. Paris, 29 Oct. 1845. He held a clerkship under the Empire, but lost it at the Restoration (1815), and afterward devoted himself to art. After studying awhile under Gros, he gradually formed for himself a style in which he had no rival. He was especially successful in his sketches of children and military incidents. His drawings numbered about 2,000. His pictures in oil include 'Episode in the Retreat from Russia' (Lyons) and 'Wounded Soldiers Halting in a Rain' (Valenciennes). Of special importance are his illustrations of 'Napoleon's Diary at Saint Helena.' Consult his biography by Lacombe (Paris 1856); Dayot (Paris 1893); Dayot, 'Les peintres militares Charlet et Raffet' (ib.).

CHARLEVILLE, shär-lē-vēl, France, town in the department of Ardennes, on the left bank of the Meuse, opposite Mézières, with which it communicates by a suspension bridge. It is regularly built, has straight, wide and clean streets, and a public square and fountain, surrounded by arcades, from which the four principal streets diverge. It manufactures hard-

ware, leather, sugar, brushes and beer; and the Meuse affords facilities for considerable trade in metals, coal, iron, slate, wine and nails. It was the mediæval Arcæ Remorum and Carolopolis, and an important military station until the destruction of its fortifications in 1687.

CHARLEVOIX, shär-lĕ-vwä, **Pierre François Xavier de,** French Jesuit traveler: b. Saint Quentin, 29 Oct. 1682; d. La Flèche, 1 Feb. 1761. He became a member of the Society of Jesus in 1698 and taught in Quebec from 1705 to 1709. After a brief return to France he was again sent to America by the Duke of Orléans. The object of this journey was the discovery of the "Western Sea" then supposed to be west of the Mississippi. He voyaged down the Mississippi to New Orleans. His chief title to fame rests on his 'Histoire et description générale de la Nouvelle France avec le journal historique d'un voyage fait dans l'Amérique septentrionale' (1744; Eng. trans. by J. G. Shea 1865–72). His other works include 'Histoire et description générale du Japon' (1715); 'Vie de la mère Marie de l'Incarnation' (1724); 'Histoire de l'ile espagnole, ou de Saint Dominque' (1730); and 'Histoire du Paraguay, (1756; Eng. trans. 1769).

CHARLEVOIX, shär'lę-voc', Mich., city and county-seat of Charlevoix County, 210 miles northeast of Grand Rapids, on the Pine River and the Pere Marquette Railroad. It has manufactures of cement, lime, lumber and stone, and a Carnegie library. It has extensive fishing and lumbering interests and is the seat of a branch station of the United States Fish Hatchery. The city is a favorite summer resort and owns the electric-lighting and water plants. It was chartered as a city in 1905. Pop. 2,420.

CHARLOCK. See MUSTARD.

CHARLOTTE, Mich., city and county-seat of Eaton County, 15 miles southwest of Lansing, on the Michigan Central and the Grand Trunk railroads. It was settled in 1835, was first incorporated in 1863 as a village, and as a city in 1871. It has a Carnegie library and manufactories of furniture, automobiles, bridges and athletic equipment. It contains also grist mills and grain elevators. The waterworks are municipal property. Pop. 4,886.

CHARLOTTE, shä'lŏt, N. C., city and county-seat of Mecklenburg County, on Sugar Creek, and on the Southern and Seaboard Airline, the Piedmont and Northern and the Norfolk Southern railroads, 267 miles northeast of Atlanta, Ga. Electric car lines connect the city with surrounding towns. The city covers an area of about 20 square miles, and its streets are macadamized and lighted with electricity. The principal public buildings are the United States post-office and courthouse, the assay office, city hall, county courthouse, the Y. M. C. A. and the Y. W. C. A. buildings, the Auditorium, several fine business blocks and numerous hotels. Nearly all the leading religions are represented, and there are many handsome church edifices. The charitable institutions include Saint Peter's Home and Hospital, a hospital for colored people, Thompson Orphanage, Presbyterian Home for Aged and Helpless Women, the Presbyterian Hospital, Alexander Rescue Home for Children, Negro Orphanage, Crittenton Home, Mercy Hospital (Catholic), and the Country Home. Beside several public and private schools there are Elizabeth College and Conservatory of Music for young women, Presbyterian College, Saint Mary's Seminary conducted by the Sisters of Mercy, North Carolina Medical College and Biddle University for colored students. There is also a Carnegie library. Charlotte is in a fertile agricultural and an extensive cotton growing region; it is the trade centre for Mecklenburg and surrounding counties, and is also the centre of the Southern cotton mill industry, having 23 mills, operating 191,266 spindles and 4,326 looms. Within a radius of 100 miles are over 400 mills operating 5,000,000 spindles, 125,000 looms and 3,000 knitting machines. The electric plants in the vicinity supply light and power for many surrounding cities and towns. There are several gold mines nearby. Manufactures include cotton-milling machinery, cotton-seed oil and by-products, various kinds of machinery, agricultural implements, fertilizers, pipe, hardware, brick, saddlery and harness, belting, clothing, boots and shoes, drugs, flour, cement and building materials, scales, caskets, show cases, etc. The United States census of manufactures for 1914 recorded 106 industrial establishments of factory grade, employing 4,279 persons, of whom 3,800 were wage earners, receiving annually $1,477,000 in wages. The capital invested aggregated $11,808,000, and the year's output was valued at $10,893,000: of this, $3,367,000 was the value added by manufacture. There are several daily, weekly and monthly publications. There are four national and one savings banks, two trust companies and three building and loan associations with combined capitalization of $4,632,590 and deposits of $5,263,279.20. The taxable valuation is about $12,000,000. The city is divided into 11 wards. The government under the 1907 charter is vested in a mayor and a board of aldermen of 21 members (elected for two years) and minor city officials. The waterworks is owned and operated by the municipality and there is a paid fire department. Charlotte was settled about 1750, was incorporated in 1768 and became the county-seat in 1774. It received its city charter in 1866 and its present charter in 1907. The Mecklenburg Declaration of Independence was signed in the city in May 1775. The signers are commemorated by a monument. During the Revolution several bloody battles were fought in and around Charlotte. In September 1780, Lord Cornwallis entered Charlotte, and occupied it for several days. He referred to it as a "hornet's nest," and this has since been adopted as the city's emblem. Later in the year General Gates made his headquarters here. The city was the last meeting place of the full Confederate Cabinet. (See MECKLENBURG COUNTY). Pop. 38,000.

CHARLOTTENBURG, shär-lŏt'tĕn-boorg, Prussia, residential suburb adjoining Berlin on the west, and now practically forming part of it, on the banks of the river Spree. It is connected with Berlin by street railway, by the Stadtbahn and the Hochbahn (an elevated road). It contains a palace built for Sophia Charlotte, the first queen of Prussia, which was begun at the end of the 17th century. In the garden is the handsome Doric mausoleum, erected in 1810 by Gentze, containing the tombs

of Frederick William III and Queen Louisa, and Emperor William I and Empress Augusta. The town was founded soon after. The town contains various important educational and other institutions, including a school of artillery and engineering, and a technical high school, royal academy of music, royal academy of art, physical-technical institute and a military preparatory school. The technical academy is a spacious and noteworthy building, and contains a valuable architectural museum. A splendid municipal opera-house was opened in 1912. The manufacturing interests are important; chief among them is a porcelain factory, founded in 1761. There are also iron foundries and manufactures of machinery, glass, pottery, electrical apparatus, dyes, wagons, asphalt, woodworking machinery, beer, paper, leather and chemicals. Pop. 305,181.

CHARLOTTESVILLE, Va., county-seat of Albemarle County, on the Rivanna River, and on the Chesapeake and Ohio and the Southern railroads, 96 miles southwest of Washington. It is the seat of the University of Virginia, founded by Thomas Jefferson, and of Saint Anne's School for Girls, Jefferson School, Miller's Manual Training School and the University Summer School. It contains also two hospitals and two sanatoriums. Monticello, Jefferson's home, is but three miles distant, to the southeast. The city has woolen, flour, silk and planing mills, tan-bark, locust-pin and cigar factories, wine presses, etc., and is in a rich agricultural and fruit-growing region. It is a popular summer resort; has electric lights and street railways, a national bank and several daily and weekly newspapers. Settled as early as 1744, Charlottesville was chartered as a city in 1888. The government is administered by a city manager elected by the city council. The waterworks and gas plant are owned and operated by the municipality. Pop. 6,765.

CHARLOTTETOWN, Prince Edward Island, Canada, capital city of the province; in Queen's County at the head of Hillsborough Bay, at the confluence of three large tidal rivers, on the Prince E. I. Railway. Its fine harbor accommodates vessels of the greatest draught, and it has a large export trade. The country in the neighborhood is very fertile and the horses of the district have a wide reputation. The fisheries are extensive and important; oysters and lobsters are plentiful, and are canned and shipped in large quantities. Charlottetown has iron foundries, woolen mills, railway workshops, packing houses, sash factory, starch factory, etc. The streets are wide, and the town well built and lighted by gas and electricity. It has good water and sewerage systems. It has fine public buildings. It has excellent public and normal schools, a business college, and is the seat of Prince of Wales College, Saint Dunstan's College (Roman Catholic) and a Methodist college. It is the seat of a United States consulate and the see of a Roman Catholic bishopric. Charlottetown was founded about 1750, by the French, and was called Port la Joie. It came under English rule in 1763 with the cession of Canada. In 1775 it was raided by American privateers, but the prisoners were returned and the property of the people restored by order of General Washington. The first conference toward a federation of the Canadian provinces was held in Charlottetown in 1864. Pop. 11,198.

CHARLTON, John, Canadian statesman: b. near Caledonia, N. Y., 1827; d. 1910. He was educated at the Springfield Academy, went to Ontario in 1849. He was for some years a farmer and merchant and acquired a fortune in the lumber business. In 1872 he was elected to the House of Commons as a Liberal. He attracted attention through his knowledge of trade and tariff questions and advocated government intervention in private and public morality. He supported the Conservative premier during the crisis of the Riel rebellion in 1885. He secured the passage of various laws for the protection of women and girls and was an advocate of reciprocity with the United States.

CHARM, anything believed to possess some occult or supernatural power, such as an amulet, spell, etc., but properly applied to spells couched in formulas of words or verse.

Among celebrated charms the Danish Danebrog, or national banner, stands prominent. This banner was said to have been woven in a day and a night by three daughters of a celebrated Norse chieftain, of the race of Ynglings said to be descended from the god Odin. These girls were deeply versed in the lore of the gods, giants, dwarfs and norns, and in the centre of the banner they placed a raven, the bird of Odin, wonderfully lifelike and realistic. The superstition was that the result of a battle was foretold by this raven, which if victory was to fall to the possessors of the banner, held its head and bill in an upright position. By observing this banner the Danes in three years' time had won 27 important battles, going into action only when the raven looked skyward. If the bird looked droopy and held its head low, they remained in camp, or, if in action, and the attitude of the raven suddenly changed, they withdrew from the field. Alfred, the king of the English Saxons, noting the enthusiasm which this banner inspired in the Danes, determined to capture it, and succeeded after a savage battle in which the Danes fought desperately for three hours. When, however, it fell into the hands of the Saxons, and the head and wings of the raven drooped, there was a general rout. The Danes were models of courage and bravery so long as superstition fanned the fire of faith in their hearts, but they were arrant cowards the minute they realized that their idol was powerless to protect them. Another curious charm is to be seen in the National Museum at Washington. This is a necklace of human fingers which was captured from the Sioux Indians in 1876, the loss of which brought about the subjection of the Indians. Consult Grendon, 'The Anglo-Saxon Charms' (in *Journal of American Folk-Lore,* Vol. XXII, Boston 1909).

CHARMES, shärm, **Francis,** French editor: b. Aurillac 1848. He was educated at the College of Aurillac and at the lycées of Clermont-Ferrand and Poitiers. In 1872–80 and 1889–1907 he was editor of the *Journal des Débats* and from 1893 to 1907 he also edited the *Revue des Deux Mondes.* He also held various public offices, principally in the Department of Foreign Affairs, was deputy for Contal in 1881–85 and 1889–98 and senator in 1900. He was

elected to the Academy in 1908. He published 'Etudes historiques et diplomatiques' (1892) and numerous literary and political articles in his editorial capacity.

CHARMIAN, kär'mĭ-ạn, or **CHARMION,** an attendant on Cleopatra in Shakespeare's 'Antony and Cleopatra.' After Cleopatra's suicide, Charmian also made away with herself.

CHARNAY, shär-nā, **Claude Joseph Désiré,** French traveler: b. Fleurieux, 2 May 1828. In 1857-61 he traveled in Mexico in behalf of the French Ministry of Education; from 1863 to 1878 he went on a number of expeditions to North and South America, Australia and other countries. In 1880 he conducted an expedition to the ruined cities of Mexico, the expense of which was borne by Pierre Lorillard; and in 1886 again visited Yucatan. He has written 'Le Mexique, souvenirs et impressions de voyage'; 'Les anciennes villes du nouveau monde' (trans. into English 1888); 'Cités et ruines américaines' (1863); 'À travers les forêts vierges' (1890); and 'Histoire de l'origine des Indiens qui habitent la nouvelle Espagne selon leurs traditions' (1903).

CHARNEL-HOUSE, a chamber or building under or near churches, where the bones of the dead are deposited. In England the crypts of some churches were formerly used as charnel-houses.

CHARNWOOD FOREST, a forest in Leicestershire, England. It is situated on a gradual rise, the highest point of which is Bardon Hill, 900 feet high.

CHARON, kā'rŏn, in mythology, the son of Erebus and Night. It was his office to ferry the dead in his crazy boat over the dark waters of Acheron, over Cocytus resounding with the doleful lamentations of the dead, and finally over the Styx, dreaded even by the immortals. The shades were each obliged to pay him an obolus, which was put, at time of the burial, into the mouth of the deceased. Those who could not pay the fare, or had been so unfortunate as to find no grave in the upper world, were compelled to wander on the desolate banks of the Acheron for 100 years, after which Charon would carry them to their final resting-place without charge. The traditions relative to Charon are posterior to the Homeric age, and it is thought that the myth was imported into Greece from Egypt. Charon is a familiar figure in literature after the 5th century B.C. His picture often appears on the Athenian white *lecythi,* or vases buried with the dead. These represent him as an old man with a long beard, wearing a seaman's garb,—the short tunic and pointed hat. He stands in a skiff which he propels with a single oar. The Etruscans, on the other hand, seem to have associated him with all the horrors of death and the place which was his boat's destination, and depicted him with bestial face, pointed ears, long tusks, carrying a large hammer or snakes. The modern Greeks preserve the tradition in the figure of Charos or Charontas, the black bird or winged horseman, who carries people to the after-world. Consult Waser, 'Charon, Charun, Charos' (Berlin 1898).

CHAROST, shä-rō, **Armand Joseph de Bethune,** DUKE OF: b. Versailles 1728; d. 27 Oct. 1800. He was a descendant of Sully, and distinguished himself on many occasions in the military service of his country. He was particularly active in the promotion of agriculture and public institutions. Long before the Revolution he abolished the feudal services on his estates, and wrote against feudal institutions. He established charitable institutions in sundry parishes, provided for the support and instruction of orphans, employed physicians and midwives, founded and liberally endowed a hospital. In a year of dearth he imported grain into Calais at his own expense. In the provincial assemblies he spoke against the *corvées.* In the assembly of the notables he declared himself for an equal distribution of the public burdens. During the Reign of Terror he retired to Meillant, where he was arrested, and did not obtain his liberty until after the 9th Thermidor. In the testimonies given in his behalf by the revolutionary committees he was called the father and benefactor of suffering humanity. He returned to Meillant, where he established an agricultural society. No sacrifice was too great for him, and his vast fortune was scarcely sufficient for his enterprises.

CHARPENTIER, shär-päṅ-tē-ā, **François Philippe,** French engraver and mechanic: b. Blois, 3 Oct. 1734; d. there, 22 July 1817. He studied copper engraving in Paris, and invented the aquatint or nitric acid process in engraving, and sold his secret to Count Caylus. Among his engravings by this process are 'Perseus and Andromeda'; 'The Beheading of John the Baptist'; 'A Shepherd'; 'The Italian Concert'; and 'The Children's Bacchanal' after De Witt. On account of his invention he was given the position of royal mechanic; in this capacity he perfected the lamps of light houses and devised a number of improvements in cannon and other firearms.

CHARPENTIER, Gustave, French composer: b. Dieuze 1860. He was a pupil of Passard and Massenet at the Paris Conservatory; and won the grand prix de Rome in 1887. He has written a number of songs: 'Napoli,' a symphony; 'La vie du poète,' a symphonic drama produced at the Grand Opera in 1892; and an opera, 'Louise,' the most notable of his works, produced at the Opéra Comique in 1898. For the two latter he wrote both words and music; 'Louise' was produced also in Germany, England and the United States with great success. Three other operas are 'Marie,' 'Orphée,' 'Tête rouge.' Charpentier was elected to the First Academy of Fine Arts in 1912.

CHARPENTIER, Johann Friedrich Wilhelm Toussaint, German mining engineer: b. Dresden, 24 June 1738; d. Freiberg, 27 July 1805. He studied law and mathematics at Leipzig, then took a position as instructor in mathematics at the mining school of Freiberg, where he devoted himself to the study of mining methods. He investigated the improved process of amalgamation used in Hungary and introduced it in Germany, besides furthering a number of other improvements. He wrote 'Mineralogische Geographie des kursächsischen Landes' (1778); 'Beobachtungen über die Lagerstätten der Erze hauptsächlech aus den sächsischen Gebirgen' (1799); 'Beiträge zur geognostischen Kenntnis des Riesengebirges schlesischen Anteils' (1804).

CHARPENTIER, Louis Eugène, French painter: b. Paris, 1 June 1811; d. 7 Dec. 1890. He was a pupil of Gerard and Cogniet, and was professor of design at the Lycée at Versailles for over 20 years. He was best known as a military painter. His first picture of importance was 'Bivouac of the Cuirassiers'; among other of his works are 'Halt of the French Army on the Saint Bernard'; 'Battle of Tchernaia'; 'Imperial Guard of Magenta'; 'Retreat from Inkermann'; 'Wellington in Spain'; 'Charge of Cuirassiers at Waterloo.'

CHARPENTIER, Marc Antoine, French composer: b. Paris 1634; d. there March 1704. He went to Rome with the intention of studying painting, but turned his attention to music and became a pupil of Carissimi. Returning to Paris he held the position of chapel-master at several places, finally at the Sainte Chapelle. He was the most prominent rival of Lully. He wrote two operas, 'Acis et Galathée' (1678) and 'Médée' (1693). He wrote 18 oratorios. One of these 'Le reniement de Saint Pierre,' was reproduced at Paris in 1903. His other works include 8 masses, 30 psalms, 60 cantatas, numerous smaller sacred compositions and some instrumental pieces.

CHARPIE, shär-pē. See LINT.

CHARQUI, chär'kē, a term applied in Peru and adjoining countries to sun dried meat. In the pre-Columbian days the Incas of Peru held a grand hunt (Quichua chacu) once every four years in each royal district of the empire. Often as many as 30,000 Indians were employed to surround the hunting grounds and to drive the guanacos and other wild animals in upon one another, when they were captured or killed. The flesh of the slaughtered animals was sun dried and divided out among the Indians. The guanacos and other llamas were shorn of their wool which was also given to the Indians to be used for making garments, while the very fine wool of the vicuñas was reserved for the use of the royal family and the temples. From the word *Charqui* comes the expression "jerked beef."

CHARRAS, shär-rä', **Jean Baptiste Adolphe,** a French republican soldier and statesman: b. Pfalzburg, Lorraine, 7 June 1810; d. Basel, Switzerland, 23 Jan. 1865. He took part in the revolution of 1830, was promoted in 1833 to the rank of lieutenant, wrote a series of able articles in the *National* on military affairs, which gave umbrage to the government and caused him to be sent to Algeria; distinguished himself there on the battlefield as well as in the training of native troops and the colonization of the country. After the revolution of 1848 he became under-secretary of state and representative for the department of Puy de Dôme. He was one of the victims of the *coup d'état* of 2 Dec. 1851, and was transported to Belgium in 1852, but expelled from that country in November 1854, at the request of Louis Napoleon, whom Charras had denounced on many occasions, but most effectively in a letter of which 50,000 copies were printed in Belgium alone. A remarkable work from his pen, 'Histoire de la campagne de 1815,' appeared in 1857; and then, 'Waterloo' (1853), and an incomplete 'Histoire de la guerre de 1813' (1866).

CHARRAS, chär'ras or chŭr'ras, a resinous substance which exudes from the Indian hemp and is collected for use as a narcotic or intoxicant, forming a considerable article of trade in Asia. See HEMP.

CHARRIÈRE, shär-rē-är, **Madame St. Hyacinthe de,** French authoress, well known under the assumed name of the ABBÉ DE LA TOUR: b. Utrecht about 1740; d. 20 Dec. 1805. In early life she became a maid of honor at the court of the Stadtholder. Her affection for her brother's tutor, M. de Charrière, a worthy but decayed Swiss nobleman, led her to forego her rank and family, and shortly after her marriage she retired with him to a small property at Neûchâtel. Her lively temperament was ill suited for the monotony of a rustic life, and accordingly seeking amusement in literary recreations she soon acquired a considerable reputation. Having lost the greater part of her fortune in the French Revolution, she reduced her expenditure to the lowest possible amount, that she might be able to continue her various acts of benevolence. Her works belong chiefly to the class of light literature. Among others may be mentioned 'Les trois femmes'; and the favorite dramas of 'Le toi et le vous'; 'L'Emigré'; 'L'Enfant gâté'; and 'Comment le nomme-t-on,' 'Lettres neuchâteloises' (1784); 'Calliste, ou lettres écrites de Lausanne' (1788), her masterpiece. All these productions not only display much wit, truth and powerful description, but also breathe a spirit of philosophy, and have a strong moral tendency. Most of them were translated into German by her friend Herder. Her friendship with Madame de Staël and Benjamin Constant brought her into prominence in the literary world.

CHARRON, sha-roń, **Pierre,** French preacher and writer: b. Paris 1541; d. 16 Nov. 1603. He studied law at Orleans and Bourges, and had practised for six years as a parliamentary advocate when he turned his attention to theology, and gained so much fame by his sermons that he was presented in rapid succession with several benefices in Gascogny and Languedoc, and appointed court chaplain to Queen Margaret. In 1588 he returned to Paris with the view of fulfilling a vow he had made to enter the Carthusian order, but owing to his age the prior of the order refused him admission, and the Celestines also declining to receive him, he continued a secular priest. In 1589 he went to Bordeaux and became very intimate with Montaigne, whom he tried to imitate, though he failed to catch his ease of style, and original, piquant wit. His principal works are 'Traité des trois vérités,' and 'Traité de la sagesse.' The Roman Catholic zeal of the former drew down upon him the rebuke of Duplessis-Mornay; and the extreme liberalism of the latter exposed him to a charge of atheism, the treatise being condemned both by Parliament and the University. Consult Leibscher, 'Charron und sein Werk: De la sagesse' (Leipzig 1890); and Vinet, 'Moralistes des 16e et 17e siècles' (1904).

CHART, a representation of a portion of the earth's surface projected on a plane. The term is commonly restricted to those intended for navigators' use, on which merely the outlines of coasts, islands, etc., are represented.

A globular chart is a chart constructed on globular projection. Mercator's chart is a chart on the projection of Mercator. A plane chart is a representation of some part of the superficies of the earth, in which the spherical form is disregarded, the meridians are drawn parallel, the parallels of latitude at equal distances and the degrees of latitude and longitude equal. A selenographical chart is a chart representing the surface of the moon; and a topographical chart is a chart of a particular place, or of a small part of the earth.

Charts are designed to assist the navigator and to subserve the interests of commerce. For purposes of navigation they may embrace large areas, like one of the great oceans or seas, delineating the conformation of the shores and outlying dangers, and perhaps indicating the principal currents and winds that may be utilized in determining the most advantageous routes between specified localities. Charts may also embrace much smaller areas, but on larger scales, permitting greater fullness of detail, and thus presenting graphically the channels that can be followed, with the depths of water, the position of lights, beacons, spindles, buoys and other objects provided to indicate the way to the stranger. Charts of these classes are usually designated "Navigation charts," although they may also be useful for other purposes.

Nearly all civilized nations have published charts of their coast lines in greater or less detail, and the principal maritime nations copy those issued by other nations, and thus maintain for the use of their own seamen charts of all parts of the world to which their commerce may extend. Great Britain maintains the most extensive establishment for the purpose, and issues the most complete series of charts; she has also made the most extensive surveys of unsettled coasts for cartographic purposes.

The United States Coast Survey, a vast undertaking, was begun in 1807, carried on intermittently till 1845, and since then more systematically, save during the Civil War, under Professor Bache, Professor Pierce and their successors. The coasts of the United States are surveyed and the charts produced by the Coast and Geodetic Survey attached to the Treasury Department, which also makes researches to determine the origin and courses of the Gulf Stream (q.v.). Unsurveyed foreign coasts and the Great Lakes are surveyed by the Bureau of Navigation, the charts being produced by the Hydrographic Office of the Navy Department. This bureau also duplicates charts and plans issued by other nations. The Coast and Geodetic charts are sold at from 10 cents to $1 each, being the cost of printing and paper. Naval vessels are supplied free. The charts are obtainable at Coast and Geodetic Survey agencies at all seaports of the United States. They exhibit accurate and minute topography as far inland as will supply landmarks for the navigator or serve for purposes of defense; the shore line at high water, and sanding to mean low water; soundings, contours and material of bottom at different depths; bars, channels, sailing ranges and directions; true meridian and compass variation; rocks, reefs, buoys, beacons, lights; tide establishment; detailed explanation of lighthouses and signal stations. They are carefully corrected for every substantial change in any of those features. They range in scale from $\frac{1}{1200}$ (30.401 inches to the nautical mile) to $\frac{1}{1200000}$ ($\frac{1}{1000}$ of an inch to the nautical mile). The Coast and Geodetic Survey issues four series of charts on the Atlantic and Gulf coasts of the United States, and three series on the Pacific Coast, designed to subserve the purposes the surveys were established to meet. The first series includes "sailing charts," which embrace long stretches of coast, as from the Bay of Fundy to Cape Hatteras, Chesapeake Bay to the Bahamas, etc., and are intended to serve for offshore navigation, or between the greater headlands, as Cape Cod, Cape Hatteras, etc., and between distant harbors, as Boston to Chesapeake Bay, Charleston, etc. They show only the outline of the continent, the seacoast lights and geographic information that will be useful for the purposes intended. The second series includes "general charts of the coast," also designed for purposes of navigation. They are on a scale three times as large as that of the first series, and embrace more limited areas, as the Gulf of Maine, Gay Head to Cape Henlopen, Galveston to the Rio Grande, etc. These charts serve the navigator in coasting alongshore between headlands, and in approaching harbors. Those of the third series, called "coast charts," embrace the whole coast on a uniform scale five times as large as that of the second series. Such charts are necessarily confined to comparatively short stretches of coast, as Sandy Hook to Barnegat, the entrance to Chesapeake Bay, Mobile Bay, etc. One inch on the paper represents about one and one-fourth statute miles, a scale sufficiently large to give the features of the topography and hydrography with great clearness, portraying the appearance of the coast and the irregularities of the bottom with a detail quite close enough for the navigation of the principal harbors. The fourth series consists of "harbor charts" on large scales, intended to meet the needs of local navigation. On the Pacific Coast the first series is similar to that on the Atlantic Coast, and extends from San Diego, Cal., to Point Barrow, Alaska. The second series is on a scale six times as large as the first, and is suitable for alongshore navigation and inland passages of southeast Alaska. The third series includes charts on scales like those of the fourth series on the Atlantic Coast.

All these series of charts are published from the same original surveys, the details of the original work being generalized or omitted to meet the requirements any particular series is intended to subserve. Various methods are available for producing charts of these classes, but experience has demonstrated that on coasts like large portions of those of the United States, which are subject to frequent changes from natural causes, necessitating extensive corrections, engravings upon copper are the most expedient and economical. The engravings afford the additional advantage of being readily duplicated by the electrotyping process. All the standard charts issued by the bureau are therefore copperplate engravings. Preliminary editions, however, are frequently issued by means of the photo-lithographic process, which affords a cheap and ready method for temporary purposes.

The Survey publishes about 500 charts, with an average annual issue of 70,000 copies.

CHARTA, Magna. See MAGNA CHARTA.

CHARTE, shärt, a term originally used to indicate the rights and privileges granted by the French kings to various towns and communities. One of the bureaus of archives of France is the Trésor des Chartes. The old charte setting forth the rights granted to the Normans by Louis X (1314–15) is still preserved under the title Charte Normand aux Normands. The first such charter in France is known as the *Grande Charte,* or the Charter of King John (1355). At present by the Charte is meant the fundamental law of the French monarchy, as established on the restoration of Louis XVIII in 1814. As is well known, it was the violation of an article of the Charte by the ministers of Charles X that led to the revolution of 1830, the expulsion of that monarch from the throne and the accession of Louis Philippe, who, on 29 Aug. 1830, swore to a new charter, sensibly modifying that of 1814 in a liberal sense. After 18 years' sway, Louis Philippe was himself expelled from France, 24 Feb. 1848, and therewith the Charte which he was called to support was canceled. Consult Floquet, 'Charte aux Normands, avec ses confirmations' (Caen 1788).

CHARTER, a document by which a superior power grants permanent or continuing rights and privileges to an inferior, either a person or persons, corporation or institution, colony, municipality, etc. Originally it had the broader sense, now obsolete, of a conveyance of land. The mediæval charters ranged from a grant of political rights by a sovereign to an entire people — like the Great Charter of England or the Golden Bull of Hungary, or colonial instruments of government conferring the broadest rights of sovereignty — down to permissive acts for abbeys and colleges or trading companies, or confirmations of rights already given (called confirmatory charters). The first-named class in modern usage is called a constitution. Thus, the agreements by which recent monarchs have deprived themselves or been deprived of absolute power and shared it with their people, as with Austria in 1866, Japan in 1868, etc., are essentially the same as Magna Charta. Charters in present usage are restricted to municipalities, corporations and institutions.

The charters for the American colonies were usually distinguished from "patents" by granting specific privileges of jurisdiction and legislation, and in general the powers needed to establish and continue a self-regulating community, instead of mere general grants of land and rights of settlement; but the two were often loosely used as interchangeable. Thus, in the acknowledgment of receipt of their charter in 1662, the Connecticut officials acknowledge also the "old charter," meaning the Warwick Patent. Strictly, they were all patents, as granted by the king under letters patent; but in use, only the grants to individuals were commonly termed patents, the word charter being reserved for those to companies and colonies already established. Of these three species, the first includes the patents to Lord Baltimore for Maryland in 1632, to Gorges for Maine in 1639, to the Duke of York (afterward James II) for New York in 1664 and to William Penn for Pennsylvania in 1681. The second comprises those to the Virginia Company in 1606, 1609 and 1612, the Plymouth and London companies in 1606, the Council for New England in 1620, the Massachusetts Bay Company in 1629, the proprietors of Carolina (1663) and Georgia (1732). The third has the two exemplars of Rhode Island (1643, confirmed 1663) and Connecticut (1662): instruments of such complete self-government that those States made no change at the Revolution, the former living under its 17th-century charter till 1818 and the latter till it was forced to change it by the Dorr rebellion in 1842. The legal nature and implications of these documents were keenly disputed in the age when their interpretation was vital, and have been argued with scarcely less heat for historical reasons since. According to the English view, they were concessions granted by the government for political reasons and revocable at its pleasure for the same reasons; the title to the lands as well as to the political privileges lay with the government, and its right to vacate either was limited only by policy; and charter governments had only such powers as were specifically given them in the charters. James II put some of these theories in practice in the union of New England in 1685 and others were acted upon generally. On the other hand the colonial view was set forth by Jeremiah Dummer in his 'Defense of the Charters' (1728); at least it was widely adopted. It was, that the charters were compacts between the government and the colonies, in consideration of the latter having cleared and taken possession of the territory and annexed it to the Crown; and that the Crown possessed only political rights there, the land title being derived from purchase and occupation and their own courage and labor. As to the powers of the charter governments, Judge Story holds that they possessed full sovereignty and power of legislation and taxation, subject only to not contradicting the laws of the mother country. The truth is that neither side had any very definite views on the matter at the outset and both developed antagonistic ones under the stress of interest.

In the United States, charters (special or general) are granted by acts of the several State legislatures or by the national government. Thus, the National Banking Act, and the general railroad acts of most States prescribe the conditions under which corporations of those classes may organize without special permission and their articles of association are their charter. The act by which a county or township is set off as an administrative division of a State is not termed a charter. On the other hand, that by which a municipality is organized, as a city or borough, is always so termed; but it has the vital distinction from a private charter that it is not a contract; the municipality has no vested rights, being a mere governmental agency and convenience; and the charter can be altered or repealed at any time by the legislature. A private charter, on the other hand, is a contract which cannot be repealed or modified by the public power unless such liberty has been expressly reserved in the charter itself. (See CORPORATIONS, LEGAL; DARTMOUTH COLLEGE CASE). Consult Cooley, 'General Principles of Constitutional Law in

the United States'; Dicey, 'Letters Introductory to the Study of the Law of the English Constitution' (5th ed., London 1912); MacDonald, 'Select Charters of American History, 1606–1775' (New York 1904).

CHARTER OAK, a tree nearly seven feet in diameter, formerly in Hartford, Conn., it blew down in a storm, 21 Aug. 1856 when its age was computed to be nearly a thousand years. A section of its trunk was preserved in the rooms of the Connecticut Historical Society; the remainder — currently believed to rival in miraculous powers of reproduction the loaves and fishes or the *Mayflower* furniture — was kept or sold for small souvenirs. It is thus venerated from a tradition, first accredited to it in 1789, that in a hollow of it was concealed the charter of Connecticut rescued from Andros in 1687; earlier ones specify an elm, others the houses of different persons. This is of little moment; but the adventures of the charter form a mystery which the latest investigations, instead of illuminating, render utterly insoluble. The contradiction of unquestionable facts is absolute. The story without these is sufficiently peculiar. James II, wishing to make Connecticut a part of his consolidated New England under Andros (q.v.), found its charter in the way; and as the colony declined to surrender it he brought writs of quo warranto to vacate it, the last of which was returnable in February 1687. To delay or avoid voluntary surrender, yet escape forfeiture and entire outlawry of rights, they replied that they would much rather stay as they were, but if they could not, preferred a provincial union under Andros over annexation to any other province. The council chose to consider this a formal waiver of charter rights, and dropped proceedings under the writ; and on 31 Oct. 1687 Andros rode over from Norwich to Hartford, under orders to assume the government. Calling the governor and council together, he demanded surrender of the charter according to their dutiful assurances. The meeting was secret; what happened we learn only from tradition and the brief account of a later intimate of the actors. The colonial officials protested and debated till after dark; that this was prearranged is not only morally certain in itself, but Trumbull's account of a long speech by the governor, to no conceivable purpose otherwise, deepens the certainty. Candles were lighted; the charter was (or the charters were) at last brought in and laid on the table; suddenly some officious candle-snuffers put out all the lights, and when they were relighted no charter was to be seen. But if Andros had no longer a charter to suppress, equally the colony had no longer one to appeal to; the old government was just as effectually extinguished as if they had let him have the paper; they cannot have foreseen a revolution in England, and it is not evident what they intended to do with it. Most likely, from their previous actions, it was merely to save their "face" from the humiliation of a formal surrender. There was no outcry by Andros, no charge made against the officials, no appearance of ill-will to them, no report of the affair to England, seemingly no disclosure of it to the train of Massachusetts magnates who accompanied him (and may or may not have attended the meeting), or to any one else; and (perhaps the most curious of all the circumstances of this curious affair) both our informant and tradition stop short at the relighted candles and the missing document, and give no hint what Andros said or if he said anything, or whether he seemed puzzled or offended, or any of the immediate sequelæ of the business. The governor (Treat) had called a meeting of the General Court, which accepted the situation and the annexation; the secretary inscribed it on the colonial records and wrote "Finis" on them; and the next day Andros publicly proclaimed his commission. When James was overthrown and Andros with him, the colony resumed its government, appealed to its charter brought from hiding, and the English authorities admitted without trial that it had never been vacated. But that was chance and not foresight. This, however, is only the beginning of mystery. The charter, obtained by Gov. John Winthrop from Charles II's council in April 1662, was engrossed in duplicate, and the official fees are entered on the English records. No other copies were made, nor could have been unless both the others were lost; and neither was lost. The first copy was sent to the colonial government, which acknowledged receipt of "the charter, the duplicate and the old copy of the former charter" (that is, the Warwick Patent). Duplicate of what? It is usually assumed to mean of the charter; but the facts to be cited prove that it was of the patent. Winthrop was to bring over the duplicate of the charter with him and a legislative committee was appointed to receive it from him. That he did not is conclusively shown by a letter from the colony to its agent, William Whiting, in 1686, instructing him to obtain it from James Porter in London, with whom Winthrop had left it, and use it in defending the colony's rights before the council. That Winthrop may have taken it across once more on official business, and left it there, is barred out by the fact that he never visited England again. That Whiting sent it back within the next year is equally negatived by the fact that he continued to need it there and the colony did not need it at all, that he would not have sent it without orders and they gave him no such orders, and that in his correspondence there is no letter of transmittal. Furthermore, a legislative committee of 1715 voted a money acknowledgment to Joseph Wadsworth for safely preserving the "Duplicate Charter" when "our constitution was struck at." It is absurd to suppose they made him the grant for preserving a second copy when they had one safe already. Obviously, the one he preserved was the only one they had. On the other hand, Roger Wolcott, the first narrator (1759), distinctly says that "the charters were set on the table," and that when the candles were relighted the *charters were gone*. Still more specifically, President Stiles of Yale writes in his 'Itinerary,' as from Wolcott, that Nathan Stanley took one copy and Governor Talcott's father the other. Wolcott was only eight at the time; but by 1714 he was in the council, in 1715 was on the very committee which made the grant to Wadsworth, and was certainly intimate with many who were present at the scene and probably helped arrange it. We have, then, the certain fact that there was but one copy of the charter in America in 1687, set against the positive assertion of one who must have known,

that two were abstracted. Still a third mystery is, that Wadsworth was not present at the meeting and could not have taken the paper; that Wolcott, who publicly honored Wadsworth as the savior of the charter, privately gives all the credit to others and does not even mention Wadsworth, and that the names he cites are really those of members present; and that if one of the actual abstracters passed it to Wadsworth waiting outside, he and not they should receive the public acknowledgment. The writer can guess at solutions to these problems, but all solutions are guesses alike.

ALBERT C. BATES,
Librarian Connecticut Historical Society.

CHARTER-PARTY, a contract executed by the freighter and the master or owner of a ship, containing the terms upon which the ship is hired to freight. The masters and owners usually bind themselves, the ship, tackle and furniture, that the goods freighted shall be delivered (dangers of the sea excepted) well-conditioned at the place of the discharge; and they also covenant to equip the ship complete and adequate to the voyage. The charterer is bound to furnish the cargo at the place of lading and to take delivery at the port of discharge within specified periods called lay days; and penalties are annexed to enforce the reciprocal covenants. Consult Scrutton, 'Contracts of Affreightment as Expressed in Charter Parties and Bills of Lading' (4th ed., London 1899).

CHARTERHOUSE, a celebrated school and charitable foundation in London, England. In 1370 Sir Walter Manny and Northburgh, bishop of London, built and endowed it as a priory for Carthusian monks (hence the name, a corruption of *Chartreuse,* the celebrated Carthusian convent). After the dissolution of the monasteries it passed through several hands till it came into the possession of Thomas Sutton, who, in 1611, converted it into a hospital, richly endowed, consisting of a master, preacher, head schoolmaster, with 40 boys and 80 indigent gentlemen, together with a physician and other officers and servants of the house. Each boy is educated at a certain expense and each pensioner receives food, clothing, lodging and an allowance of about $150 a year. The pensioners, "poor brethren," must be over 50 years of age and members of the Church of England. The Charterhouse School was removed to new buildings near Godalming, in Surrey, in 1872, the premises sold to the Merchant Taylors' School, a fine range of buildings being erected on the site. The non-academic department of the Charterhouse still remains in the old buildings. The special garb of the scholars has been discarded, and Charterhouse is one of the great public schools of England. Several of the famous men who have received their education at the Charterhouse are Isaac Barrow, Addison, Steele, John Wesley, Blackstone, Grote, Thirlwall, Havelock, John Leech and Thackeray. Charterhouse, and one of its "poor brethren," Colonel Newcome, has been immortalized by Thackeray in 'The Newcomes.' Consult Brown, Haig, 'The Charterhouse, Past and Present' (London 1879); Taylor, W. F., 'The Charterhouse of London' (London 1912).

CHARTERIS, Archibald Hamilton, Scottish clergyman and educator: b. Wamphray 1835; d. Edinburgh, 25 April 1908. He received his education at Edinburgh, Tübingen and Bonn, and in 1863 became pastor of the Park Parish, Glasgow. From 1868 to 1898 he was professor of Biblical criticism at Edinburgh, and in the latter year became professor emeritus. In 1892 he was moderator of the General Assembly of the Church of Scotland. He was appointed chaplain in ordinary to the king in 1901. He published 'Life of James Robertson' (1863); 'Canonicity' (1881), 'New Testament Christian Scriptures': 'A Faithful Churchman' (1897) and 'The Church of Christ' (1905).

CHARTERS TOWERS, Australia, a mining township of Queensland, on the northern spurs of the Towers Mountain, 820 miles northwest of Brisbane. The place was first settled in 1871–72, when gold was discovered there. In 1877 it was incorporated as a town. Now it has railway connection with the coast by means of a railroad to Townsville. Pop. 15,037.

CHARTIER, shär-tē-ā, Alain, French poet and moralist: b. Bayeux about 1392; d. about 1440. He was educated at the University of Paris, and was appointed by Charles VI clerk, notary and secretary of the royal household — posts which he held under Charles VII. His contemporaries considered him the father of French eloquence. Although far from handsome it is said that he received one day while asleep a kiss from Margaret of Scotland, wife of the Dauphin, who explained her conduct to the surprised bystanders by saying that it was not the man she kissed, but the mouth whence flowed so many golden words. His poems are often graceful and nervous, and his vigorous prose contains many fine thoughts and prudent maxims. The subjects of his poems are mainly lovers' quarrels. However his 'Livre des quatre dames' and 'Le quadrilogue invectif' (1422) are filled with fine patriotic ardor. His works were edited by A. Duchesne (Paris 1617). Consult Delaunay, 'Etude sur Alain Chartier' with extracts from his writings (Paris 1876), and Joret-Desclosières, 'Alain Chartier' (1897).

CHARTISM, a working-class movement in England, 1838–48, the primary purpose of which was the attainment of certain political reforms. The Reform Bill of 1832 had failed to bring the expected advantages to the working class; the new poor law of 1835 was unpopular; and a period of general commercial depression and a succession of bad harvests had increased the sufferings of the people. The discontent resulting found definite expression in the "Charter" or "People's Charter" prepared in 1838 by a committee of six members of Parliament and six workingmen. It comprised six heads: (1) Universal suffrage, or a right of voting conferred on every male of 21 years of age, of sound mind, unconvicted of crime, and a native of the United Kingdom, as well as to every foreigner possessing the same qualifications, who had been resident in the United Kingdom for more than two years; (2) equal electoral districts; (3) vote by ballot; (4) annual Parliaments; (5) no other qualification to be necessary for members of Parliament than the choice of the electors; (6) members of Parliament to be paid for their services. (Of the above six

demands, Nos. 3, 5 and 6 are now embodied by statute).

At first a portion of the middle class supported the movement, but they became estranged, and the Chartists became more and more a distinctively working-class party. The movement was not purely political; it was of a distinctively social nature—a «knife-and-fork question»—and aimed at the improvement of general social conditions. Stephens, one of the leaders, is quoted as saying: «Chartism is no political movement where the main point is gaining the ballot. . . . The Charter means a good house, good food, prosperity, and shorter working hours.» Immense meetings were held throughout the country, numbering sometimes upward of 200,000, and popular excitement was great. Physical force was advocated by some as the only effectual means for the masses to obtain their demands. An association called the National Convention was embodied, and commenced its sittings in Birmingham in May 1839. In June of the same year a monster petition in favor of the charter, purporting to be signed by 1,280,000 persons, was presented to the House of Commons, which refused to take it into consideration. The feeling of exasperation among the Chartists increased, and in November a riot took place at Newport, in which 10 persons were killed and great numbers wounded. The year 1842 was the time of the most excitement; great riots took place in the northern and midland districts of England, and these, though not directly caused by the Chartists, were more or less connected with the movement, and the party was blamed for them. In 1848 a great demonstration was planned in London, but the precautions taken by the government in enrolling special constables and making other preparations for defense frightened the leaders and the demonstration was shorn of its imposing nature. From that year dates the decline of the movement; the repeal of the Corn Laws—which the Chartists opposed as likely to benefit only the middle classes—and the great expansion of trade following on that measure reacted favorably on the condition of the workers and stilled social tumult.

Bibliography.— McCarthy, 'History of Our Own Times'; Carlyle, 'Chartism'; Gammage, 'History of the Chartist Movement'; Engels, 'Condition of the Working Class in England in 1844'; Hyndman, 'Historical Basis of Socialism in England'; Kingsley's 'Alton Locke'; and the autobiography of Thomas Cooper, one of the leaders (London 1880).

CHARTRAN, shär-trăn, **Théobald,** French painter: b. Besançon, 21 Jan. 1849; d. 16 July 1907. He studied under Cabanel, and obtained the grand prix de Rome in 1877. He painted mostly historical pictures or portraits; among his works are 'The Body of Monseigneur Darboy lying in state in the Palace of the Archbishop of Paris'; 'Angelica and Roger'; 'Vision of Saint Francis of Assisi,' museum, Carcassonne; 'Capture of Rome by the Gauls'; and several portraits, of which the best are those of Mounet-Sully as Hamlet, Sadi Carnot and Leo XIII. Later he spent a few months of each year in New York city and numbered among his sitters President Roosevelt, President McKinley, Admiral Dewey, Andrew Carnegie and Cardinal Gibbons. His 'Signing of the Peace Protocol at Washington,' an episode of the Spanish-American War, was presented to the United States government by Mr. H. C. Frick of Pittsburgh. Consult Martin, Jules, 'Nos peintres et sculpteurs' (Paris 1897).

CHARTRES, shärtr, **Robert Philippe Louis Eugène Ferdinand D'Orléans,** Duc de, grandson of Louis Philippe: b. Paris, 9 Nov. 1840. When only two years old he lost his father and six years later the Revolution drove him along with his family into exile. The young duke was brought up in England and joined the Union army in the first campaign of the American Civil War in 1862. He married, 11 June 1863, Françoise Marie Amelie d'Orléans, eldest daughter of the Prince de Joinville. After the revolution of 4 Sept. 1870 in France, he served for two years in General Chanzy's army under the pseudonym of «Robert le Fort,» and before the close of the war had risen successively to the ranks of captain and chief of squadron. He became chief of squadron in the Chasseurs d'Afrique, under his own name, was appointed colonel in 1878, but in 1883 was suspended from the active service. In 1886 his name was stricken from the army list by a law excluding members of royal families from serving in the army or navy. He published 'Souvenirs de voyages' (1869).

CHARTRES, shärtr (anciently Autricum, Civitas Carnutum), France, capital of the department Eure-et-Loire, 49 miles southwest of Paris, situated on the slope of a hill, at the foot of which flows the Eure, and partly enclosed by walls and ditches, surrounded by ramparts planted with trees, which form an agreeable promenade. Most of the houses are built of wood and plaster and have their gables toward the street. The streets of the lower town are narrow and crooked, and so steep in some parts as to be inaccessible to carriages. There are several public squares, one of which is of great extent. The only public buildings of note are the cathedral, the church of Saint Pierre, contiguous to a huge barrack, once a Benedictine abbey, and the obelisk to the memory of General Marceau. The cathedral, one of the most magnificent in Europe, is rendered conspicuous by its two spires, one of which is 413 feet high, surmounting the hill on which the city stands. It has 130 windows filled with painted glass of admirable workmanship; and in its chair Henry IV was crowned in 1594. It is also famous for its sculptures. Chartres is the seat of a bishopric, communal college, seminary and agricultural society, and has two hospitals, a cabinet of natural history, botanical garden and a public library of 127,409 printed volumes. Toward the end of the 11th century it was fortified, and in 1145 Saint Bernard preached, in its cathedral, the second crusade. Chartres has manufactures of woolens, hosiery and leather and is the great cattle and grain market of the fertile plain of Beauce and the department. It has a chamber of commerce and a branch of the Bank of France. It was taken by the English in 1417 and recovered in 1432. In 1870 it was occupied by the Germans and formed their base of operations against the army of the Loire. Pop. (1911) 24,103. Consult Plerval, 'Chartres, sa cathédrale, ses monuments' (1896); Adams, 'Mont Saint Michel and Chartres' (Boston 1913).

CHARTREUSE, shär-trėz, the French term for a Carthusian monastery, corresponding to the Italian Certosa. The order of the Carthusians (q.v.) was most rigorous in its rules, though each monk was allowed a decent cell and a garden of his own, so that the monasteries had often architectural character. The famous monastery called La Grande Chartreuse is the original and supreme monastery of the order, and exists in the mountains not far from Grenoble in eastern France. Of the monastic buildings still existing, none is architecturally noble, and nearly all are of date later than the middle of the 17th century. Therefore it does not rank with the great showplaces of monasticism for the grandeur and splendor of its buildings, but has ever attracted travelers, curious or serious, as being the home of the most authentic exemplars of primitive monasticism in its rigor. At the Revolution the whole establishment was confiscated, the monks driven out and secularized or banished. But in 1816 the order of Carthusians was permitted again to occupy the buildings, as tenants of the state, at a nominal rent. They were again expelled from their ancient home by the government of the French republic in 1903 under the laws for suppression of religious houses. When the monks were this time dispossessed the entire rural population of the vicinity, who had all their lives experienced the large, wise beneficence of the monks in supporting the local hospitals, schools, churches and the like, would have defended their benefactors against the power of the government had not the Carthusians counseled patience and forbearance. Till this second ejection from their home the monks used to derive a revenue from the sale of certain medicinal agents prepared in their laboratories which enjoyed a high reputation; in particular the cordial liqueur Chartreuse. The other preparations were an elixir and a salve.

CHARTULARY, kär'tū-lā-rĭ, a collection of charters. When any body, ecclesiastical or secular, came to be possessed of a considerable number of charters, it was customary for convenience and safety to have them classified and copied into a book or roll. Such book or roll has generally received the name of a Chartulary. Mabillon traces chartularies in France as far back as the 10th century, and some authorities say that chartularies were compiled even still earlier; but it was not till the 12th and 13th centuries that chartularies became common. They were kept by all kinds of religious and civil corporations, but also by private families. Many of them have been printed and their contents generally are of the greatest value in historical, archæological and genealogical inquiries. The name is in Scotland applied to the record of feu-charters kept by the superior's law-agent. Copies of valuable historical documents, whose originals have been lost, have been found in Chartularies. Some interesting English reprints are made in Grass, 'Sources and Literature of English History' (London 1900).

CHARYBDIS. See SCYLLA AND CHARYBDIS.

CHASE, Frederic Henry, English Biblical scholar and prelate: b. 21 Feb. 1853. He was educated at Christ's College, Cambridge, and took orders in the English Church. He was lecturer in theology at Pembroke College 1881–90, and at Christ's College 1893–1901; principal of the Clergy Training School at Cambridge from 1887–91; Norrisian professor of divinity and president of Queen's College, 1901–05; and from the latter year bishop of Ely. He has published 'Chrysostom' (1887); 'The Lord's Prayer in the Early Church' (1891); 'Old Syriac Element in Codex Bezæ' (1895); 'Syro-Latin Text of the Gospel' (1897); 'Credibility of the Book of the Acts' (1901); 'Essays on the Gospels' (1905); 'Confirmation in the Apostolic Age' (1909).

CHASE, Frederick Lincoln, American astronomer: b. Boulder, Colo., 28 June 1865. He was graduated at the University of Colorado in 1886 and at Yale in 1891. From 1891 to 1911 he was assistant astronomer and in 1910–13 acting director of the Yale Observatory. He wrote 'Heliometer Triangulation of the Victoria Comparison Stars' in *Annals* of the Cape Observatory (1897); 'Triangulation of the Principal Stars of the Cluster in Coma Berenices' (1896); 'Parallax Investigations on 163 Stars mainly of large Proper Motion' (1906); 'Parallax Investigations on 35 Selected Stars' (1910); 'Catalogue of Yale Parallax Results' (Vol. II, pt. 4, 1912), and miscellaneous papers in the *Astronomical Journal.*

CHASE, George, American lawyer: b. Portland, Me., 29 Dec. 1849. He was graduated valedictorian at Yale in 1870, and at Columbia Law School in 1873. He was assistant professor of municipal law at Columbia University 1874–78; professor of criminal law, torts and procedure 1878–91; member of the university council 1890–91. In 1891 the New York Law School was chartered through his efforts, and he was chosen its dean, a position he still holds. Publications: 'Chase's American Student's Blackstone' (4th ed., 1914); Chase's 'Stephen's Digest of the Law of Evidence' (2d ed., 1898); 'N. Y. Code of Civil Procedure' (12th ed., 1914); Chase's 'Cases on Torts' (2d ed., 1904); 'Chase's Pocket Code' (1911).

CHASE, Philander, American Protestant Episcopal bishop: b. Cornish, N. H., 14 Dec. 1775; d. Jubilee College, Ill., 20 Sept. 1852. He was graduated at Dartmouth College in 1795, and was ordained priest by Bishop Provoost 10 Nov. 1799. After missionary work in New York State and rectorships at New Orleans, La., and Hartford, Conn., he set out as a missionary in districts west of the Alleghanies. In Ohio he organized various parishes, and in 1819 was consecrated the first bishop of Ohio. Between 1821 and 1831 he was for two years president of Cincinnati College, but chiefly engaged in perfecting plans for a theological seminary. He visited England, and through the influence of Lord Gambier and Lord Kenyon raised a large sum of money, $30,000, with which he founded the Theological Seminary and Kenyon College at Gambier, Ohio. In 1831 he resigned his bishopric and the presidency of the college and seminary, removed to Michigan 1832, was chosen bishop of Illinois 1835; again visited England and raised $10,000 with which he founded Jubilee College, Peoria County, Ill. Upon the death of Bishop Griswold in 1843, Bishop Chase became presiding bishop of the Church. He wrote 'A Plea for the West' (1826); 'The Star in the West, or Kenyon

College' (1828); 'Defense of Kenyon College' (1831); 'A Plea for Jubilee' (1835); 'Reminiscences: An Autobiography' (1848).

CHASE, Pliny Earle, American scientist: b. Worcester, Mass., 18 Aug. 1820; d. Haverford, Pa., 17 Dec. 1886. He was graduated at Harvard, 1839; taught in Philadelphia and engaged in business for many years, but employed his leisure in physical and philological studies. In 1864 the Magellanic gold medal of the American Philosophical Society was awarded him for his 'Numerical Relations of Gravity and Magnetism.' The results of other mathematical and physical researches were published from time to time in the 'Proceedings' of the American Philosophical Society, and brought him a wide reputation, both in the United States and abroad, as a man of unusual scientific powers and attainments. In 1871 he became a member of the faculty of Haverford College, Pa., and for a long time was professor of philosophy and logic. He published 'Elements of Meteorology' (1884).

CHASE, Salmon Portland, American jurist and statesman: b. Cornish, N. H., 13 Jan. 1808; d. New York, 7 May 1873. He was the son of Ithamar and Janet Ralston Chase, the former of English and the latter of Scotch descent. After a preliminary education in schools at Keene, N. H., and Windsor, Vt., and under a tutor, he went to Ohio in 1820 under the care of his uncle, Philander Chase (q.v.), Episcopal bishop of Ohio, and attended the bishop's school at Worthington, near Columbus, doing farm work when not in the school room. He studied for a year at Cincinnati College but then returned to Keene, in 1824 entered Dartmouth College as a junior, teaching in country schools during the winter vacations, and graduated in 1826. He then went to Washington, D. C., for the next three years taught in a boys' school there, during which time he studied law, and in December 1829 was admitted to the bar. In March 1830 he went to Cincinnati, where he began the practice of law, soon becoming known as one of the best lawyers in that city. He also made an impression as a lecturer, delivering several lectures before the Cincinnati Lyceum, which he was largely instrumental in founding, two of his lectures being published in the *North American Review* entitled "The Life and Character of Henry Brougham" (July 1831) and "Effects of Machinery" (January 1832). In 1832 he formed the project of publishing a collection of the laws of Ohio with notes and references, and his work, even though it did not reward him financially, became the standard edition and gave him a solid reputation throughout the West. He also wrote a brief but excellent historical sketch of Ohio. In July 1834 Chase became solicitor of the Cincinnati branch of the Bank of the United States, and in the following November became solicitor of the Lafayette Bank, these trusts affording him so lucrative a practice that his literary pursuits were practically abandoned. In 1841 his connection with the Bank of the United States was severed because his fees were considered too high, but politics and the anti-slavery movement were beginning to absorb his attention and his loss failed to disturb him. Meanwhile on 4 March 1834 he had married Catherine Jane Garniss, who died 1 Dec. 1835; on 26 Sept. 1839 he married Eliza Ann Smith (d. 29 Sept. 1845), and on 6 Nov. 1846, Sarah Bella Dunlop Ludlow (d. 13 June 1852). Of his six children only two lived to maturity.

Early in his career Chase became identified with the anti-slavery movement. He was aroused not by the wrongs of the slaves altogether but by the dangers to white men, and his earliest act as an anti-slavery man (1836) was to defend the rights of a fellow citizen (James G. Birney) to express his mind freely. He indignantly disavowed any sympathy with the disunion sentiments of William Lloyd Garrison (q.v.), declaring that he was not one of those "abolitionists or anti-slavery men who regarded the Constitution as at war with moral obligations and the supreme law." He states in his diary that he differed from Garrison and others "as to the means by which the slave power could be best overthrown and slavery most safely and fitly abolished under our American Constitution." He was a frequent speaker at anti-slavery meetings and conventions throughout Ohio and the neighboring States and even in the East, but he was neither an orator nor a good stump speaker. His great forte was the preparation of formal addresses and platforms, since in these he had time and space more carefully and comprehensively to marshal his facts and thoughts, and accordingly from 1841 to 1848 he was often called upon by the Liberty and Free Soil men to undertake such tasks. But while Chase's powers of statement made him a valuable ally of the Ohio anti-slavery men, he became their leader in the period from 1837 to 1849 chiefly through his pronouncements against slavery and his legal services in connection with fugitive slave cases. He became known as the "attorney-general of fugitive slaves," but was defeated in every case in which he appeared for the defense. Some of his arguments were against indisputable historical facts — such as his absolute denial that Congress possessed power to establish slavery anywhere by any process, though he did admit that laws had been framed to support slavery in the District of Columbia, in the territories, and (as regards fugitive slaves) in free States, but he declared Congress had no constitutional power to enact such laws. He held the Fugitive Slave Act of 1793 to be contrary to the Ordinance of 1787, which provided for recovery of slaves only from the "original States" and to be incompatible with the constitutional form of Federal government for, said he, "when a slave passes beyond the jurisdiction of the State in which he is held as such, he ceases to be a slave, because he continues to be a man and leaves behind him the law of force which made him a slave." The law was contrary to the letter and spirit of the Constitution, in denying "due process of law" and authorizing "unreasonable searches and seizures"; the States and not Congress were responsible for the apprehension of fugitive slaves; and finally, "the legislature cannot authorize injustice by law; . . . it cannot repeal the laws of nature, cannot create any obligation to do wrong, or neglect duty. No court is bound to enforce unjust laws." These and other arguments were used in his various cases. In March 1837 he acted as counsel for an alleged fugitive slave, Matilda, and for Birney, who was accused of "harboring"

her. Chase based his argument on the fact that Matilda had been brought into Ohio by her master and had then escaped, wherefore she was a free person and could not be "a person held to service or labor in one State, under the laws thereof, escaping into another." The judge decided against Chase, and Matilda was remanded into slavery, but Birney appealed and the State Supreme Court reversed the decision. The most famous of the Ohio fugitive slave cases was that of John Van Zandt, who attempted to convey to safety some slaves who had escaped from their owner and were later recovered by force. One of the slaves escaped, however, and the owner sued Van Zandt to recover the slave's value and the expense of recapturing the others and also to recover the penalty of $500 allowed by the act of 1793 against anyone who "after due notice harbored and concealed" a fugitive. Chase defended Van Zandt at the first trial in July 1842 and lost, but the award of $500 against Van Zandt was appealed to the Supreme Court, which in 1847 sustained the lower tribunal.

Anti-slavery had already begun to play a prominent part in Ohio politics and to Chase fell the task of organizing, politically, the Liberty and Free-Soil parties. Up to 1840 politics had only a mild interest for Chase, though he was a delegate to the National Republican Convention that nominated Clay in 1832. In 1836, though a Whig, he voted for General Harrison, as he did also in 1840, showing no sympathy for his friend Birney, who in 1840 was the candidate of the new Liberty party. But in May 1841 Chase had deserted the Whig party forever and had cast in his lot with Birney. Within a year he was practically the leader of the Liberty party in Ohio and for eight years organized conventions, prepared party addresses and bolstered up the anti-slavery press. He took part in the National Liberty Convention at Buffalo in 1843 and again in 1847, but through a shrewd move he practically dissolved the old Liberty party and secured a convention of the party members, now known as Free-Soilers, at Buffalo in August 1848. This convention, over which Chase presided, nominated Van Buren for the Presidency. On 22 Feb. 1849, through a curious combination of Democrats, Independent Democrats and Free-Soilers in the State legislature, he was elected to the United States Senate. There he continued his opposition to slavery during the stormy scenes of the period of compromise in 1850, and was particularly outspoken, especially in his speech of 26-27 March 1850, in condemning Clay's position and proposal. Chase usually acted with the Democrats, claiming to have been elected as a Democrat, and thereby losing a large share of the confidence of the Free-Soilers, but he gradually became estranged from the Democrats, too, and in 1851 to 1852 spent much of his time in a futile attempt to build up a "Free Democracy"; finally in 1852 the nomination of Pierce on a pro-slavery platform compelled him to withdraw entirely from the Democratic party and to rejoin his old Free-Soil allies. In 1853, however, the Democrats secured a majority in the State legislature and therefore Chase failed of re-election to the Senate. In 1854, even with such men as Sumner and Seward in the Senate, he became the leader of the opposition to the Kansas-Nebraska bill and on 24 Jan. 1854, in collaboration with Sumner, Giddings and others, issued the historic "Appeal of the Independent Democrats in Congress to the People of the United States," but he could not prevent the passage of the bill. The political result of the struggle was the rending of the Whig party and the formation by the northern Whigs and independent Democrats of the Republican party, largely due to Chase's activities. In July 1855, therefore, the "Anti-Nebraska" Republican Convention of Ohio nominated him for governor and after a close contest he was elected. He made an excellent executive, introduced many needed reforms and continuing his efforts in behalf of the negro, and in 1856 believed himself qualified for the Presidency, but he could not secure pledged votes sufficient for his nomination at the Republican convention and withdrew his name. In 1857 he was re-elected governor; thenceforth he was recognized as a Republican leader, and on 2 Feb. 1860 was again elected United States Senator for the term beginning 4 March 1861. Again in 1860 he endeavored to obtain the Presidential nomination but was unsuccessful and in January 1861, at the solicitation of Lincoln (then President-elect), accepted the post of Secretary of the Treasury, taking the oath of office 7 March and thus relinquishing the senatorship.

Hardly had he assumed office when, in April 1861, the Civil War began. He rehabilitated the disorganized and almost bankrupt treasury; suggested and secured the enactment of new taxes and property confiscation acts; borrowed money, maintained the national credit, regulated commerce; provided the legal tender paper currency authorized by Congress; insisted upon the establishment of a national banking system and finally saw it put into operation; and administered his department and the financial affairs of the country in so creditable a manner as to distinguish himself as one of the great incumbents of that important Cabinet office. (See UNITED STATES, FINANCES OF THE, 1861). Despite his onerous duties he never lost sight of the slavery question, supported Butler's contention that slaves escaping within the Union army lines were "contraband of war" and advocated the arming of negroes. He opposed Lincoln's colonization scheme but warmly supported the Emancipation Proclamation, though it did not exactly conform to his conception of the proper method of solving this problem. He differed with the President in many of his political views; held a widely divergent idea of the functions of department heads and felt aggrieved when Lincoln disregarded his advice on military affairs; he corresponded with army commanders and has even been accused of counseling disobedience to the President's orders, directly criticising him and expressing a distrust of him, that, considering its source, could only have created dissension among those for whose conduct Lincoln was directly responsible to the people. Like Seward, Chase hoped to obtain ascendency over Lincoln, and when he learned that Lincoln, after his own fashion, completely dominated the situation and was determined to survive or perish according to the success or failure of his own policies, he resigned (as did Seward, too,) 20 Dec. 1862, petulantly stating that he expected his opinions and those of his colleagues to carry more weight with the President — "there are certain heads

of departments, but no real Cabinet." Lincoln refused to accept the resignations, but on 3 March 1863 Chase prepared another resignation because Lincoln refused to nominate a revenue collector selected by him. Again on 11 May 1863 Chase became disgruntled because Lincoln removed an official whom he considered unfit for his post, but Lincoln again refused to accept the proffered resignation. The minor differences between Lincoln and Chase were accentuated by their rivalry for the Presidential nomination in 1864, but the issuance in February 1864 of the so-called "Pomeroy Circular," criticising Lincoln, rendered impossible Chase's nomination and placed him in a delicate relationship with the President, wherefore on 22 February he again offered to resign and again was requested to remain. Finally in June 1864 another dispute arose over patronage in New York and though peacefully settled Chase, still sore because of Lincoln's renomination, decided once more to resign (29 June) and this time (30 June) Lincoln unexpectedly accepted it, appointing W. P. Fessenden (q.v.) as his successor.

Before his retirement from the Cabinet Chase had signified a desire to be chief justice of the Supreme Court and in spite of many objections Lincoln nominated him 6 Dec. 1864 to fill the post recently made vacant by the death of Chief Justice Taney (q.v.). He continued to advocate the universal enfranchisement of the negro, warmly sympathized with the work of the Freedmen's Bureau, and in 1866 became president of the "American Freedman's Union Commission," a benevolent society intended to advance the work of civilization. He took little part in President Johnson's dispute with Congress regarding reconstruction, but privately opposed the readmission of any seceded State until it had granted suffrage to negroes; he drafted the Fourteenth Amendment, which, somewhat extended, was accepted and passed by Congress, and later used it in his dissent from the court's decision in the Slaughter House Cases (q.v.). Chase considered the President's military governments abnormal, and even after Johnson's proclamation declaring the war at an end (2 April 1866) he steadfastly refused to hold court in Virginia and North Carolina (which were included in his circuit) "until all possibility of claim that the judicial is subordinate to the military power is removed by express declaration from the President." In June 1867, however, he assumed his functions at Raleigh. Chase dissented from the Court's decision in the Milligan (see MILLIGAN DECISION), Cummings and Garland cases and refused to sit in the trial of Jefferson Davis until late in 1868 when, however, the amnesty proclamation of 25 Dec. 1868 permitted Davis' release and the case was not tried on its merits. Though considering the trial impolitic and unjust, Chase presided with calmness and good judgment over the impeachment of President Johnson in 1868. Prior to this time he had allowed his friends again to bring his name before the Republicans as a candidate for the Presidential nomination, but soon became convinced that he could not secure the Republican nomination and entirely changed his attitude toward that party, within a few weeks endeavoring to become the standard-bearer for the Democrats. However, he was not nominated and continued his work on the bench, writing numerous important decisions of the Court, such as that in the case of Texas *vs.* White, wherein he expounded the nature of the government as "an indestructible Union, composed of indestructible States," reversing his previous theory of State suicide and as he did also in the case of White *vs.* Hart in 1872, approving the method of reconstruction that had been adopted. He wrote the Court's decision in the case of Hepburn *vs.* Griswold and thus in 1869 reviewed judicially and construed the statutes which as an administrative officer he himself had set in motion only a few years previously. The Court decided that the Legal Tender Act was unconstitutional in so far as it compelled the acceptance of legal tender paper currency in payment of debts contracted before the statute. By the subsequent decisions in the legal tender cases (q.v.), however, Chase was reversed, the Court holding the act constitutional. These contests were especially trying to Chase and the continual strain of the past few years began to affect him. In August 1870 he was stricken with paralysis but gradually improved, and though absent from the Court during the term of 1870–71 he sat during the terms of 1871–72 and 1872–73, preparing numerous opinions. He was well enough also in 1872 again to desire the presidential nomination, but in 1873 he began to fail rapidly, on May 6 suffered a second stroke while in New York and passed away there the next day.

Bibliography.— 'Diary and Correspondence of Salmon P. Chase' (in 'Annual Report' of the American Historical Association for 1902, Vol. II, pp. 11–527, Washington 1903); Hart, A. B., 'Salmon Portland Chase' (Boston 1899); Jones, F. R., 'Salmon Portland Chase' (Boston 1902); Pike, J. S., 'Chief Justice Chase' (New York 1873); Shuckers, J. W., 'Life and Public Services of Salmon P. Chase' (New York 1874); Warden, R. B., 'An Account of the Private Life and Public Services of Salmon Portland Chase' (Cincinnati 1874).

IRVING E. RINES.

CHASE, Samuel, American jurist, one of the signers of the Declaration of Independence: b. Somerset County, Md., 17 April 1741; d. 19 June 1811. His father, a learned clergyman, instructed him in the classics; later he studied law at Annapolis, being admitted to the bar at the age of 20. Having become a member of the colonial legislature, he distinguished himself by his bold opposition to the royal governor and the court party. He took the lead in denouncing and resisting the Stamp Act, and became a most active adversary of the British government in his State. The Maryland Convention of 22 June 1774 appointed him to attend the meeting of the General Congress at Philadelphia in September of that year. He was also present and conspicuous in the subsequent Congresses during the most critical periods of the Revolutionary War. That of 1776 deputed him on a mission to Canada along with Dr. Franklin, Charles Carroll of Carrollton and the Rev. John Carroll. He signed the Declaration of Independence without hesitation. In June 1783 the legislature of Maryland sent him to London as a commissioner to recover stock of the Bank of England and large sums of money which belonged to the State. In 1791 he accepted the appointment of chief justice of the General

Court of Maryland. Five years afterward President Washington made him an associate judge of the Supreme Court of the United States. Political cases of deep interest having been tried when he presided in the Circuit Courts, and his conduct having given much displeasure to the Democratic party, he was impeached by the national House of Representatives. The trial of the judge before the Senate is memorable on account of the excitement which it produced, the ability with which he was defended himself and the nature of his acquittal. He continued to exercise his judicial functions with the highest reputation till 1811, in which year his health failed. Consult 'The Impeachment Trial of Judge Samuel Chase' (in the *American Law Review*, Vol. XXXIII, Saint Louis 1899); Smith and Lloyd, 'The Trial of Samuel Chase' (Washington 1805); Adams, 'History of the United States' (New York 1889).

CHASE, Thomas, American educator: b. Worcester, Mass., 16 June 1827; d. Providence, R. I., 5 Oct. 1892. He was a brother of Pliny E. Chase (q.v.). In 1855 he became professor of philology and classical literature at Haverford College, near Philadelphia; from 1875 to 1886 its president. Among his publications are 'Hellas: Her Monuments and Scenery' (1861); an address on 'Liberal Education: Its Aims and Methods'; a 'Latin Grammar' (1882); and editions of various Latin authors.

CHASE, William Henry, American military officer: b. Massachusetts 1798; d. Pensacola, Fla., 8 Feb. 1870. He was graduated at the United States Military Academy, became first lieutenant of engineers in 1819, captain in 1825 and major in 1838. He was engaged in repairing Fort Niagara in 1817–18; as superintending engineer for many important works in 1819–28; and had charge of the defenses in Pensacola harbor, Florida, 1828–54. He superintended the improvements of Mobile Bay; as senior engineer officer had charge of all the fortifications and river and harbor improvements at the mouth of the Mississippi, and took an influential part in all projects connected with the development of the region around Pensacola. At the outbreak of the Civil War he entered the Confederate army, and was prominent in the seizure of the Pensacola navy yard.

CHASE, William Merritt, American artist: b. Franklin, Ind., 1 Nov. 1849; d. New York city, 25 Oct. 1916. He studied painting in oil at the National Academy in New York and subsequently in Europe with Piloty, acquiring a thoroughly German method. On his return to New York in 1878 he began to change his style of painting, gradually clarifying his color and showing an appreciation for the work of the French school. One of the most facile and brilliant technicians of the American school, Chase succeeds equally well with figure, portrait and still life — particularly his fish, which are especially celebrated. Examples of his work are in the Metropolitan Museum, New York, the Pennsylvania Academy and Brooklyn Institute Museum. He has made a specialty of portraits and figure pieces, winning celebrity with 'Ready for the Ride,' 'The Apprentice' and 'The Court Jester,' and portraits of American ladies. His more recent works include 'American Fish' (1905); 'Flying Clouds' (1906); and 'Portrait of an Artist' (1906); 'Portrait of Mrs. J.' (1910); 'Studio Interior' (1911); 'The Orangery' (1911); and 'Portrait of Mrs. H.,' awarded the Proctor prize in 1912. He was appointed instructor at the Brooklyn Art School in 1881 and elected a National Academician in 1890.

CHASIDIM, hă-sē'dĭm, the name of a Jewish sect which appeared in the middle of the last century. See JEWISH SECTS.

CHASING, the art of indenting artistic or ornamental designs on metals. Figures on metal are often produced in relief by being punched out from behind, and sculptured or finished on the front with small chisels and gravers. It is this latter process that is properly called chasing, and the same term is applied to designs produced by hand-tools on more or less flat surfaces. The process is a very old one and is frequently seen on ancient Greek works of art. Phidias used it effectively. Benvenuto Cellini (q.v.) is the more modern master of chasing.

CHASKA, Minn., city and county-seat of Carver County, 22 miles southwest of Minneapolis, on the Chicago, Milwaukee and Saint Paul and the Minneapolis and Saint Louis railroads, and on the Minnesota River. There are extensive brickyards here and the city contains also canning and pickle factories, foundry and machine shops and a flour mill. The electric lighting plant is municipally owned. Pop. 2,050.

CHASLES, shäl, **Michel,** French engineer: b. near Chartres, 15 Nov. 1793; d. Paris, 18 Dec. 1880. He entered the École Polytechnique in 1812, and on leaving was classed among the engineers; but with rare generosity he renounced his place as an officer in order to assure a career to one of his unsuccessful comrades. In December 1829 he addressed to the Brussels Academy a memoir on two general principles of geometry, duality and homography. The introduction to this memoir expanded into the well-known 'Aperçu historique sur l'origine et le developpement des méthodes en géométrie,' the first edition of which was published in 1837. In 1841 he was appointed to the chair of machines and geodesy at the École Polytechnique, and in 1846 to that of higher geometry, which had just been instituted at the Sorbonne. Some of his published works are 'Treatise on Higher Geometry' (1852); 'The Three Books of Euclid's Porisms Re-established for the First Time' (1860); 'Treatise on Conic Section' (1865); 'Reports on the Progress of Geometry' (1870). These, his principal works, are geometrical and historical. His contributions to the 'Comptes Rendus' of the Academy of Sciences and to other scientific publications are extremely numerous, and though in the main geometrical, are not exclusively so. In particular he treated in several memoirs the question of attraction, and gave the first synthetic demonstration of a celebrated theorem of Maclaurin on the attraction of ellipsoids. Two of his memoirs on the properties of cones of the second degree, and on the spherical conics, were translated into English, and published, with additions, by Charles Graves in 1841. He contributed much to projective geometry (see GEOMETRY, PROJECTIVE) and to the "method of

characteristics» (q.v.). During his long life he was the recipient of many scientific distinctions, and he will always be cited as one of the great geometers of the present century.

CHASLES, Victor Euphémion Philarète, French critic: b. Mainvilliers, near Chartres, 8 Oct. 1798; d. Venice, 18 July 1873. The son of a Jacobin, and educated according to Rousseau, he acquired the point of view which, enlarged by life abroad, makes his essays so unique and instructive. In 1815 he assisted Valpy in an edition of Greek and Latin authors in England. In 1837 he became curator of the Mazarin Library and in 1841 professor of continental languages and literatures at the Collège de France. He has written in every imaginable prose form, from a romance to a riddle; but his enduring work is contained in 'Tableau de la marche et du progrès de la langue et de la littèrature françaises depuis le commencement du XVIe siècle jusqu'en 1610' (8 vols., ——1828; 'L'Antiquité' (1847); 'Le seizième siècle en France' (18 vols., 1847); 'Les Voyages d'un critique à travers la vie et le livre' (1866-68, 2d series); and 'Mémoires' (1876-78). His principal service to French literature lies in the fact that he was one of the first of the French critics to stimulate a lively interest in the literatures of England, Russia and Scandinavian countries.

CHASSAIGNAC, shă-sān-yāk, **Charles Louis,** American physician: b. New Orleans, 25 Jan. 1862. He was graduated at the medical department of the University of Louisiana in 1883; was president and professor of genito-urinary diseases at the New Orleans Polyclinic from 1897 to 1906. He was editor of the *New Orleans Medical and Surgical Journal;* president of the Orleans Parish Medical Society; president of the Louisiana State Medical Society; one of the founders and president of the New Orleans Sanitarium and Training School for Nurses. In 1906 was appointed dean of the Graduate School of Medicine of Tulane University, continuing as professor of genito-urinary and rectal diseases. In 1914 he became managing editor of the *American Journal of Tropical Diseases* and in 1915 was elected consultant in genito-urinary diseases at the Charity Hospital of New Orleans. Has been a trustee of the Eye, Ear, Nose and Throat Hospital for many years.

CHASSÉ, shā-sā', **David Hendrik,** BARON, Dutch soldier: b. Thiel in Guelders, 18 March 1765; d. Breda, 2 May 1849. He began his military career when but 10 years of age; became lieutenant in 1781 and captain in 1787. After the failure of the revolutionary movement he took French service; was appointed lieutenant-colonel in 1793; and two years later found himself marching towad the Netherlands under the command of Pichegru. He afterward fought with the French in Germany and Spain, gaining great distinction, and from Napoleon himself, because of his fondness for bayonet charges, the name of «Général Baïonette.» He was made a baron by Louis Bonaparte in 1809. As lieutenant-general of the Dutch forces, in 1815, Chassé did good service at Waterloo against his old comrades, the French. As governor of Antwerp he defended the citadel for three weeks with 5,000 men against 60,000 Belgians and French (1832), but he was forced to surrender. He was a French prisoner of war until May 1833, when he was released and retired.

CHASSEPÔT, Antoine Alphonse, French inventor: b. 4 March 1833; d. Gagny, in the Seine-et-Oire, 14 Feb. 1905. He was an employee in the Paris arsenal of Saint Thomas, where he became an official in 1858, and in 1863 brought before the government the model of his breech-loading rifle, adopted three years afterward, and subsequently abandoned. It was about four pounds lighter than the needle-gun and about one pound lighter than the Martini-Henry rifle.

CHASSEPOT, shās-pō, **RIFLE,** a breech-loading rifle, named after its inventor, and adopted as the firearm of the French infantry in 1866, after the value of the Prussian needle-gun had been shown in the war between Prussia and Austria. It is not now in use, having been replaced in 1874 by a much modified form of small-arms. It was a bolt-action gun with a peculiar system of obturation and a paper cartridge. In the war of 1870 it proved a much better weapon than the German needle-gun (q.v.). It was considerably lighter than the needle-gun, the weight of the latter being 12 pounds, and that of the former less than nine pounds. In accuracy, penetrative power, length of range, lowness of trajectory and rapidity of fire, it was inferior to the Martini-Henry. To the needle-gun it was superior in length of range and lowness of trajectory, as was shown in the war of 1870, in which the French could open fire at the distance of 1,500 paces, while the effective range of the needle-gun was only 400 to 500 paces. This superiority, however, was neutralized by the fact that its lightness and its large charge had the effect of producing great recoil and of heating the barrel. At the commencement of an action the men would open fire at long range, but before closing with the enemy the barrel of their piece was so heated that the weapon could hardly be handled. From the recoil and heating combined, the soldier was obliged to fire from the hip, so that his aim was not accurate; while after much firing the breech became clogged. The chassepot weighed 9 lb. 5 oz., was 6 feet 2 inches long with bayonet, had a calibre of .433 inches, and fired a 386 grain lead bullet with a charge of 86.4 grains of black powder at a muzzle velocity of 1,328 feet per second. It was sighted to 1,312 yards (1,200 metres).

CHASSEUR, shā-sèr, a male attendant upon persons of distinction, attired in a military dress, and wearing a sword. It is also the name given by the French to bodies of light infantry which act as skirmishers and sharp-shooters. The name was originally given to some troops raised in 1815, in imitation of the Jägers of the Austrian army, who were chiefly Tyrolese chamois-hunters, and unerring marksmen. The French Chasseurs are of two kinds, light cavalry and infantry. Every battalion of infantry has a company of Chasseurs, but the term is more particularly applied to that body of men called the Chasseurs de Vincennes, who were enrolled and armed with rifles in 1833, and quartered at Vincennes. The Chassuers of the Italian army are called Bersaglieri. Garibaldi's Chasseurs, that took a prominent part in the

Italian war of 1859, and in the campaign against Francis II of Naples, in 1860, were known as Cacciatori dei Alpi, or Alpine hunters.

CHASSIS, shâs'sē, in automobiles, that part of the vehicle made by machinists, as distinguished from the body made by the carriage or wagon builder. It includes the frame, wheels and machinery. The frame consists generally of two fore-and-aft members and three or four cross members of pressed steel riveted together with gusset plates at the joinings. This frame is the foundation on which is mounted the power plant with its controls and transmission gear, and it is set upon the axles of the running gear or slung below them, according to type. See AUTOMOBILE.

CHASTELARD, shät-lär, **Pierre de Boscobel de**, French poet: b. Dauphiné 1540; d. 1563. He fell madly in love with Mary Stuart at the French court, and poured forth his admiration in innumerable poems. He figures as one of her escort on her return to Scotland after the death of her husband (1561). He had to return to France after this pleasing duty was performed, but on the first opportunity he was again in Scotland (1562). Mary gave him a very gracious welcome, answered, it is said, a poem dedicated to her, and allowed him to accompany her singing with his flute. His indiscreet love led to a public trial at Saint Andrews and hanging. Consult Swinburne, 'Chastelard: a Tragedy' (London and New York 1906); Hewlitt, 'The Queen's Quhair' (New York 1904).

CHASTELARD, a tragedy published in 1869, by Algernon Charles Swinburne, the scene of which is laid at Holyrood Castle, during the reign of Mary Queen of Scots. The tragedy is conspicuously one to be read, not acted. It is too long, too much lacking in action and of too sustained an intensity, for the stage. The style is essentially lyric, full of exquisite lines and phrases; and as a whole, the play presents an intense passion in a form of adequate beauty. See CHASTELARD, PIERRE DE BOSCOBEL.

CHASTELER, Jean Gabriel, MARQUIS OF: b. near Mons, Belgium, 1763; d. Venice, 7 May 1825. He received his first education at Metz in the Collège de Fort. In 1776 he entered the Austrian service. After having served against the Turks, by whom he was severely wounded, he displayed his zeal for the house of Austria in the disturbances in the Netherlands. In 1796–97 he was employed in the negotiations of his court in Poland and Russia; was afterward with Suwarov in Italy, where he distinguished himself in several engagements with the French armies. In 1808, with Hormayr, he was the soul of the famous insurrection in the Tyrol, and all the political as well as military events which were connected with it. He was finally defeated at Tyrol and his army was routed 13 May. After the close of the war he received several appointments, and in December 1814 was made governor of Venice.

CHASTELET, shät-lā, **Gabrielle Emilie Breteuil**, brė-tė-yėi, **MARQUISE DU**: b. Picardy 1706; d. Lunéville 1749. She was of an ancient family, was taught Latin by her father, Baron Breteuil, and was well acquainted with that language, but her favorite study was mathematics. She had a sound judgment and much taste, loved society and the amusements of her age and sex, but after the publication of the 'Philosophical Letters' by Voltaire had roused the Jesuits' criticism against him, she abandoned all these pleasures, and in 1733 retired with him to the dilapidated castle of Cirey, situated in a dreary region on the borders of Champagne and Lorraine. She embellished this residence, formed a library, collected instruments, etc. Cirey was often visited by the learned,—by Maupertuis, John Bernouilli, etc. Here the Marchioness learned English of Voltaire in the space of three months, and read with him Newton, Locke and Pope. She also wrote an analysis of the system of Leibnitz, and translated Newton's 'Principia' with an algebraic commentary. Voltaire lived six years with her at Cirey, where they employed their time in the study of science, and in getting up lovers' quarrels for the pleasure of patching them up again. At the end of this time she went to Brussels to prosecute a lawsuit, which was terminated by an advantageous compromise, brought about by Voltaire. She also carried on a correspondence with the German philosopher, Wolf, until her death. Her 'Traité de la nature du feu' obtained the prize of the Parisian Academy of Sciences, and is published in their collections. Her husband, the Marquis du Chastelet Lomont, was high-steward of King Stanislaus Leszinsky at Lunéville.

CHASTELLUX, shät-lüks, **François Jean, MARQUIS DE**, French historian: b. Paris 1734; d. Paris, 28 Oct. 1788. He entered the army in 1749; distinguished himself as colonel in the Seven Years' War, and later served in the American Revolution as major-general under Rochambeau, and gained the friendship of Washington by his amiable character. He published numerous works relating to the United States, including 'Voyages dans l'Amérique septentrionale dans les années, 1780–1782; 'Discours sur les avantages et les désavantages qui resultent pour l'Europe de la découverte de l'Amérique'; and translated into French David Humphry's 'Address to the Army of the United States.' Consult Chastellux, 'Notice sur le Marquis de Chastellux' (Paris 1822); and Pascallet, 'Notice historique sur la maison de Chastellux' (Paris 1844).

CHASUBLE, chäs'ū-bl, the outermost vestment worn by a priest in celebrating the mass: its name in Latin is *casula*, dim. of *casa*, house. In its original form it was a garment of circular or elliptical form like the South American *poncho*, with an opening in its centre through which the head of the wearer passed. But the form of chasuble now employed almost universally consists of a more or less oval front and back joined at the top, where is an opening to allow the head to pass through. The garment is usually of silk embroidered and decorated with gold or silver thread, and with a cross on the back. Chasubles of different colors, white (or cloth of gold), red, violet, green, black, are worn according to the occasion; as white on all high festivals, violet in penitential times, red on the anniversaries of martyrs, black in masses for the dead, etc. In the present form of the chasuble the priest's arms are free, whereas in the ancient form, the garment covered the per-

son like a cloak. See COSTUME, ECCLESIASTICAL.

CHATARD, Francis Silas Mareau, American Roman Catholic prelate: b. Baltimore, Md., 13 Dec. 1834. He was graduated from Mount Saint Mary's College, Emmitsburg, in 1853, and in 1856 took the degree of M.D. at the University of Maryland. After practising medicine a year, he entered the Urban College of the Propaganda, Rome, studied for the priesthood and was ordained 14 June 1863, obtaining the degree of D.D., August 1863. In November 1863 he was appointed vice-rector of the American College, Rome, and in 1868 was promoted to the rectorship, the institution flourishing under his management. Later he was made papal chamberlain to Pope Pius IX, who greatly esteemed him. On 26 March 1878 he was nominated bishop of Vincennes by Pope Leo XIII, and consecrated in Rome 12 May 1878. The title of the see was changed from Vincennes to Indianapolis 23 March 1898. Bishop Chatard has translated works from the French, and is much interested in the cause of education. He is at present assisted in his diocese by a coadjutor bishop, the Rt. Rev. Joseph Chartrand.

CHÂTEAU-LAFITTE, lā-fēt, **CHÂTEAU LATOUR,** and **CHÂTEAU MARGAUX,** famous vineyards, all in the department of the Gironde, France, furnishing the best of the red wines of Bordeaux. See BORDEAUX WINES.

CHÂTEAU-THIERRY, tā-rē, France, town in the department of Aisne, on the right bank of the Marne, 38 miles south-southwest of Laon, and 59 miles northeast of Paris. It occupies the side of a hill, whose rocky summit is crowned by the ruins of the old castle of Thierry, said to have been built by Charles Martel, in 730. It is the birthplace of La Fontaine (to whom a fine marble statue has been erected), and was the scene of several conflicts during the campaign of 1814. On 9 Sept. 1870, it was occupied by the Germans, and became a few days later the temporary headquarters of the Emperor. Its chief buildings are a commercial college, a public library and an old cathedral. It possesses a court of primary resort and a communal college. The Champagne district begins here, and, besides its wine trade, it is famous for the manufacture of musical and scientific instruments and woolen yarn; stone is quarried near by. Consult Poquet, 'Histoire de Château-Thierry' 2 vols., 1840). Pop. 7,771.

CHATEAUBRIAND, shā-tō-brē-ān, **François Auguste René,** VICOMTE DE, French author and politician: b. Saint Malo, Brittany, 4 Sept. 1768; d. Paris, 4 July 1848. He received a commission in the army in 1788, and at the commencement of the Revolution he hurried into Paris to witness the great commotions then taking place there. In the spring of 1791 his ardent and enthusiastic spirit led him to join an expedition to America for the purpose of exploring its Arctic regions, and discovering the northwest passage. He crossed the Atlantic, landed at Baltimore, and proceeded to Philadelphia, where he had an interview with Washington. Returning to France in 1792 he married Celeste Buisson de Lavigne, a girl of 17, who brought him a small fortune. Out of his American experience largely grew his 'Les Natchez' (see NATCHEZ, LES). Shortly after his return from America he quitted France and joined with other emigrants the Prussian army on the Rhine. At the siege of Thionville he was wounded in the thigh, and subsequently became an exile in England. Here his health gave way, and friendless and penniless he continued for a time to wear out a miserable existence in London. He at last found means of earning a subsistence by giving lessons in French and executing translations for the booksellers. In 1797 he published his 'Essai historique, politique et moral sur les révolutions anciennes et modernes, considérées dans leurs rapports avec la Révolution Française.' It did not win very much success in England, and attracted no notice whatever in France. The essay is pervaded by a strong skeptical spirit in religious matters, but its author's views on this subject were soon to experience a sudden and important change. The death of his mother in prison, and the accounts of her last moments transmitted to him by his sister, who herself was no more by the time her letter reached her brother, made a lasting impression on the mind of Châteaubriand, and he became a firm believer in Christianity. In 1800 he ventured to return to France and take up his abode under an assumed name at Paris. Encouraged by the success of an essay on literature, contributed to the *Mercure,* he published in 1801 his 'Atala,' which was afterward introduced as an episode into his 'Génie du Christianisme.' In the following year appeared his celebrated work 'Le Génie du Christianisme,' which may be said to have caused a religious reaction, and inaugurated a new period in the social history of France. The object of Châteaubriand was to demonstrate the superiority of Christianity over all other religions in a poetic and artistic, as well as moral and beneficial point of view. Though a work more brilliant than profound, it is unsurpassed for beauty of language and description and the eloquence of its impassioned appeals. The main charm indeed of the book may be said to lie in its beautiful imagery, drawn from external nature, and more especially from nature as exemplified in the glowing scenery of the New World. In this respect Châteaubriand may be said to have revived in French literature the description of natural scenery and objects which had long been almost unknown. His work attracted the attention and admiration of Bonaparte, and in 1803 he was appointed French minister for the republic of the Valais. This office he resigned in 1804.

In order to give life and tangible form to the theories propounded in the 'Génie du Christianisme,' he commenced 'Les Martyrs,' and to qualify himself for describing accurately the scenes amid which the poem is laid, made a pilgrimage to the East. In 1809 'Les Martyrs' was published, and is considered by many the best of his works. Some of the descriptions, such as of the ancient forests of Gaul, the assemblies of the Christians in the catacombs and the picture of Rome under the emperors, are given with marvelous beauty and effect. In 1811 appeared his 'Itinéraire de Paris à Jerusalem.' The restoration of Louis XVIII was hailed by him with enthusiasm, and a pamphlet entitled 'De Bonaparte et des Bourbons,' published by him in 1814, was said by the King to

have been worth to him an army of 100,000 men. On the second restoration he preserved the title of minister of state, but refused to take office along with Fouché. On the accession of Villèle to power Châteaubriand was appointed Ambassador to Berlin, then to London, and in September 1822, crossed the Alps to represent France at the congress of Verona. In 1824 he was summarily dismissed from office at the instance of Villèle, and the indignation which he felt at such treatment made him join the ranks of the opposition, where in the columns of the *Journal des Débats* he fulminated attacks against government. On the accession of the Martignac ministry he again returned to office, and proceeded as ambassador to Rome, but resigned this appointment on Polignac becoming Premier. On the revolution of 1830 he refused to take the oath of allegiance to Louis Philippe, and consequently forfeited his seat in the House of Peers and a pension of 12,000 francs. In 1831 a new work appeared from his pen, entitled 'De la Restauration, et de la monarchie élective,' in which occurs the following singular avowal: "I am a Bourbonist by honor, a royalist by reason and conviction, and a Republican by inclination and character." In the same year he published his 'Études ou discours historiques sur la chute de l'Empire Romain,' a work exhibiting more of the imagination of the poet than the critical acumen of the historian. Owing to several pamphlets of a legitimist tendency issued by him, he was arrested in 1832, but defended by M. Berryer, and acquitted. In the latter years of his life he published an 'Essay on English Literature,' a literal prose translation of 'Milton's Paradise Lost,' and other works. His memoirs appeared after his death, under the title of 'Mémoires d'outre tombe.' They possess a great interest, and contain many charming passages, but are at times disfigured by the ebullitions of personal vanity, which formed one of the principal weaknesses of Châteaubriand. He was an intimate friend of the celebrated Madame Récamier, whose feeling toward him amounted almost to worship. He was the first in France to draw attention to the literary resources of the Middle Ages and Christian antiquity. He was a renovator in imagination and persuaded his generation to break with the imitation of imitation that had sapped the literary life of the 18th century. His style left its mark on poetry, history, fiction — on the very language. His effect on religion and morals was transitory, but in literary art he opened a new era. (See GENIUS OF CHRISTIANITY, THE). Consult Lenormant, M., 'Châteaubriand et ses mémoires,' and also works upon his life and literary work by Villemain and Saint Beauve; Phailhès, 'Chateaubriand, sa femme et ses amis' (Bordeaux 1896); Lemaitre, 'Chateaubriand' (1912); 'Correspondance général de Chateaubriand,' edited with introduction, etc., by L. Thomas (3 vols., Paris 1912–13).

CHÂTEAUDUN, shă-tō-dėń, France, town in the department of Eure-et-Loire, 26 miles south-southwest of Chartres, near the right bank of the Loire. Its streets are straight and terminate in a square, from which a complete view of the town may be obtained. The hôtel de ville, library and college buildings are deserving of notice. The old castle of counts of Dunois overlooks the town. Châteaudun has manufactures of blankets and machinery, and large tanneries, and some trade in cattle, grain, wool and hemp. In the Franco-German War the town was captured by the Germans (18 Oct. 1870), who held it till 9 November, when they were driven out by the French; it was, however, recaptured some few days after. Pop. 7,296.

CHATEAUGUAY, shăt-ō-gā', **RIVER**, Lower Canada: operations on in the War of 1812; and battle of 25 Oct. 1813. (For the previous operations in the campaign against Montreal, see CHRYSTLER'S FARM). Gen. Wade Hampton had been for some months in command at Burlington, Vt., when Wilkinson ordered him to advance on Montreal; ostensibly to co-operate with himself, though he had not yet started down the Saint Lawrence. Hampton moved to the Canada line; then, finding that a drought had impaired the water supply on the straight road, marched westward to Chateauguay, N. Y., some 50 miles from the mouth of the Chateauguay River, an affluent of the Saint Lawrence. He remained there three weeks, menacing the British communications and opening up his own, building roads, getting up supplies and artillery, etc. On 16 October Armstrong ordered him to approach the river-mouth for convenient junction with Wilkinson; and on the 22d–24th he established himself at Spear's, about 15 miles from the mouth. He had some 4,000 raw troops and 200 dragoons. Prevost had about 15,000 around Montreal, and the river lined with gunboats and batteries, while Hampton had not even transports, and was in the heart of a hostile country. Prevost could have captured his whole army without much trouble; but he was really alarmed that Hampton was excellently posted to threaten the communications and supplies on the river. When Hampton advanced to Spear's, the British militia there retired; but Lieutenant-Colonel de Salaberry with 800 regulars intrenched himself in front on the road to the Saint Lawrence, and filled the road with abattis. Hampton felt it needful to restore his communication with the river, and on the night of the 25th sent a strong flanking party around, while he himself attacked Salaberry in front. The former lost his way, and on this account he did not press his own attack. He lost 50 men, the British 25. Just then he received a message to prepare winter quarters; and feeling sure the campaign was to be abandoned, fell slowly back to Chateauguay, unmolested by Prevost. A week later he received a request from Wilkinson to send supplies forward and march down the river: he replied that he had none to send, and as Wilkinson evidently had not enough to sustain a forward movement, he should fall back to Plattsburg. Wilkinson received the message the day after his defeat at Chrystler's, and at once went into winter quarters.

CHATEAUNEUF DE RANDON, shă-tō-nėf-dė-răń-dōń, France, small town in the department of Lozère, 12 miles northeast of Mende, on a hill. It was formerly fortified, and is celebrated for the four years' siege sustained by the English garrison in 1380, against the troops of Charles V, commanded by the chivalrous Duguesclin. During this siege the English governor, who had been hard pressed,

promised to surrender to Duguesclin at the expiration of 15 days, if no succor arrived. Before the end of the time agreed upon Duguesclin died, when his successor summoned the governor, who replied that he had given his word to Duguesclin, and would yield to no other. Informed of the hero's death, he said, "Then I will carry the keys to his tomb." Accordingly the governor sallied forth with the garrison to Duguesclin's tent, and on his bended knees laid his sword and the keys of the town on the bier. In 1820 a simple commemorative monument was erected at the hamlet of Bitarelle, on the spot where this event occurred. Pop. 3,541.

CHATEAUROUX, shă-tō-roo, France, capital of the department of Indre, 166 miles south-southwest of Paris, in an extensive plain, left bank of the Indre. It has straight, broad and tolerably well-paved streets, and spacious squares, with a public garden and some fine promenades. The cloth manufactures, in which the wools of Berry are almost exclusively used, are extensive, employing about 2,000 workmen. Cotton hosiery, woolen yarn, tiles, paper, hardware, tobacco and parchment are also made; and there are tanneries and dyeworks. There is likewise a considerable trade in grain, wine, iron, wool, poultry and cattle. The town owes its origin to a castle built in 950 by Raoul le Large, of Déols, still in a tolerable state of preservation. It was considerably extended in the reign of Louis XIII, who constituted it a duchy in favor of the descendants of Henry II of Bourbon, Prince of Condé. It was the prison of Richelieu's niece, the Princesse de Condé, for 23 years. Charles of Bourbon sold it to Louis XV, who conferred it on one of his mistresses, at whose death it returned to the Crown. During the revolution of 1793 it was called Indreville. Across the Indre lie its beautiful suburbs, Christophe and Déols. The church of Saint André, the hôtel de ville with its Flemish paintings and souvenirs of Napoleon I, and the statue of Gen. Henri Bertrand, a native, are among the points of interest. Pop. 26,095.

CHATELAIN, shât-lăń, **Emile Louis Marie,** French philologist: b. Montrouge, 25 Nov. 1851. He is curator of the library of the University of Paris and secretary of the section of science, history and philology of the Practical School of Higher Studies at the Sorbonne. He is editor-in chief of the *Revue des Bibliothèques* and was in charge of the *Dictionnaires Quicherat.* He is one of the noted classical philologists of France.

CHATELAIN. See CASTELLAN.

CHATELARD, shä-tē-lär. See CHASTELARD.

CHÂTELET, Belgium, manufacturing town in the province of Hainaut, on the Sambre, five miles east of Charleroi. It contains a number of smelting works and iron foundries. Its chief industries are coal mining and the manufacture of cotton-stuffs, knives, nails and pottery. Châtelineau, opposite to it, has a pop. of about 11,500. Pop. 11,573.

CHÂTELET, shăt-lā', was anciently a small château or fortress, and the officer who commanded it was called *châtelain.* The word is a diminutive of *château,* formed from *castellum,* a diminutive of *castrum*; or from *castellatum,* a diminutive of *castellum,* castle. The term, in later times, has been applied to certain courts of justice, established in several cities in France. The Grand Châtelet, in Paris, was the place where the presidial or ordinary court of justice of the prévôt of Paris was kept, consisting of a presidial, a civil chamber, a criminal chamber and a chamber of police. The term signified the same at Montpellier, Orleans, etc. When Paris was confined to the limits of the old city (*cité*), it could be entered only by two bridges (Le Petit Pont and Le Pont au Change), each of which was fortified with two towers — a smaller one in the wall, facing the city, and a larger one before the bridge, toward the country. These two exterior turrets were the Grand and Petit Châtelet. The tradition that the Grand Châtelet was built by Julius Cæsar, though adopted by some, is not well supported; but it is certain that the great tower was standing as early as the siege of the city by the Normans (885). The Grand Châtelet was the castle of the Counts of Paris, and therefore the seat of all the royal courts of justice within the city and county, and also of the feudal court. The city had no proper jurisdiction whatever; its bailiff or provost (*prévôt*) was appointed by the king, and was president of the court (though only nominally, because he had no voice in the judgments), and, by virtue of his office, leader of the nobility. The office of provost of the merchants (*prévôt des marchands*; in other cities *maire*), established before the former, and afterward united with it for a time, was finally separated from it in 1388. The business of the Châtelet was transacted by the deputies of the bailiff (*lieutenants*), of whom there were five, three for civil causes, one chief judge of criminal cases, and a lieutenant-general of police (*lieutenant-général de la police*). The latter, indeed, was Minister of Police for the whole kingdom, and the extent of his functions and power, particularly after the new arrangement made by the celebrated d'Argenson under Louis XIV, rendered him one of the most important officers of the state. In the Châtelet, however, he held only the fourth place. The whole court of justice was composed of 57 counsellors, with 13 state attorneys and a multitude of subalterns, as 63 secretaries or *greffiers,* 113 notaries, 235 attorneys, etc. All these offices were sold. The place of the first officer of the civil chamber was rated at 500,000 livres; that of a notary at 40,000 livres. The Châtelet was first in rank after the Supreme Courts (*cours souveraines*).

CHATFIELD-TAYLOR, Hobart C., American author: b. Chicago, 24 March 1865. He was graduated at Cornell University in 1886. In 1888–90 he was editor of *America,* was consul of Spain at Chicago in 1892–94, and became a member of several honorary societies of Spain, France, Italy and Portugal. He has written 'With Edged Tools' (1891); 'An American Peeress' (1893); 'Two Women and a Fool' (1895); 'The Land of the Castanet' (1896); 'The Vice of Fools' (1898); 'The Idle Born' (1900); 'The Crimson Wing' (1902); 'Molière; a Biography' (1906); 'Fame's Pathway' (1909); 'Goldoni; a Biography' (1913) and contributions to various magazines and periodicals.

CHATHAM, William Pitt, 1st Earl of ("The Great Commoner"), British statesman: b. Westminster, 15 Nov. 1708; d. Hayes, Kent, 11 May 1778. He was the younger son of Robert Pitt, M.P. for the family borough of Old Sarum, and afterward of Boconnoc, Cornwall. He was educated at Eton and Trinity College, Oxford. From boyhood he was a martyr to gout — indeed throughout his career he was persistently dogged by ill health; and he was compelled for health reasons to leave college without taking his degree, and was advised to travel. At the age of 23 he obtained a cornetcy in the Blues, and was returned M.P. for Old Sarum in 1735. He joined the opposition to Sir Robert Walpole, and in his maiden speech so incensed that minister that he declared "we must muzzle that terrible cornet of horse," and Pitt was at once cashiered and his commission canceled. His speeches in the House, however, steadily advanced his reputation in Parliament and the country. He was appointed groom of the chamber to Frederick, Prince of Wales, who was at enmity with his father, and to whom the members of the Parliamentary opposition looked for promotion or place on his succession on the death of the old king, George II. Pitt soon became the most prominent member of the House of Commons. His denunciation of Walpole's convention with Spain in 1739 was followed a few months later by that statesman reluctantly embarking in a war with that country, which he conducted with lethargy. Pitt was the head and front of the opposition to Walpole, and succeeded in driving him from office in 1742. But though driven from office, he was still the power behind the throne. Pitt incensed the King by the freedom with which he denounced the policy of the British Cabinet as conceived in the interest of the King's foreign dominion — "this absurd, ungrateful and perfidious partiality to the German interest. If ministers prefer the interests of Hanover, Parliament regards only the interests of Great Britain." He also opposed the policy of buttressing Maria Theresa by means of British money and troops. Pitt afterward modified his views; but the King was difficult to placate. In 1744 he received, as a mark of appreciation of his patriotism, a legacy of £10,000 from the Duchess of Marlborough — a welcome windfall to a man whose private income was only £100 a year. In 1746 Pitt, who had cut himself adrift from the Prince of Wales, received the subordinate post of joint vice-treasurer of Ireland in the Broad Bottom administration, and later in the same year was made paymaster-general of the army. His refusal in the latter office to accept a commission on subsidies to foreign powers and other "perquisites" of the office — amounting to many thousands of pounds per annum,— which his predecessors and successors accepted, greatly increased his hold on the country. On the death of Pelham he pushed his claims to cabinet rank; but the hostility of the court stood in his way, and Sir Thomas Robinson, a creature of Newcastle's, was appointed to lead the Commons. Pitt took his revenge by flouting both Newcastle and Robinson, and in November 1755 he was dismissed from office. He never at any time commanded any number of votes in the Commons — he placated no magnates and he gave no bribes; his strength lay with the people. He married on 15 Nov. 1754, Hester Grenville, the only sister of Earl Temple, and the marriage was one of unclouded happiness.

Pitt at this period might well have despaired. The personal hostility of the King appeared unappeasable, and without his consent he could not reach the position at which he aimed and to which the country was insistently calling him. A series of grave reverses to British arms brought about the fall of Newcastle; the Duke of Devonshire was called upon to form an administration, in which Pitt became secretary of state for the southern department and leader of the House of Commons (4 Dec. 1756). He had the country with him; but the King and the magnates succeeded in compassing his fall, and in April 1757 he was again dismissed from office. But 11 weeks later he was recalled to office, and then began his great administration which lasted to 5 Oct. 1761. Newcastle was his co-ordinate in the ministry, and in his accomplished hands the patronage and jobbery were retained; but almost absolute power was in the hands of Pitt. The Seven Years' War had broken out: Frederick of Prussia was threatened by a confederacy of five powers; France asserted her claim to the whole of the North American continent from the sources of the Mississippi to Hudson Bay and was bent on hemming in the English colonists to the seaboard east of the Alleghanies. Pitt had a true appreciation of the value of sea power and he determined on the destruction of French influence in America. He began by expeditions against Rochefort, Saint Malo and Cherbourg, which while they did not achieve any decided success, were of assistance to Frederick in his conflict against the continental alliance. He spared no labor; the plans of campaign, the choice of commanders — in which he discarded seniority — the preparation of the armaments, were all in his hands. "The ardor of his soul set the whole kingdom on fire," and he cultivated the loyal co-operation of the colonists in American campaigns. Louisburg was taken; the valley of the Ohio secured; the conquest of Canada was completed; the dominating influence in North America passed from France to Great Britain. "With the triumph of Wolfe, the history of the United States began," says J. R. Green, the historian; "Pitt laid the foundation of the great republic of the West." Guadeloupe was taken from the French; Boscawen won a victory off Cape Lagos, and Hawke off Quiberon Bay. Pitt's reign of power also synchronized with French defeats in India and with the foundation of the British empire in the peninsula. "The position which Pitt occupied at the end of the reign of George the Second was the most enviable ever occupied by any public man in English history. He had conciliated the King; he domineered over the House of Commons; he was adored by the people; he was admired by all Europe. He was the first Englishman of his time; and he had made England the first country in the world."

George III's accession to the throne was followed by the undermining of Pitt's influence: the young monarch was desirous of keeping the affairs of state pretty much in his own hands, and was under the influence of his mother and the Earl of Bute, his groom of the stole. Pitt became aware of the family com-

pact between France and Spain in September 1761, and wanted to declare war on Spain while she was unprepared, and failing to secure his policy, resigned office. He was offered the governorship of Canada or the chancellorship of the duchy of Lancaster; but accepted a pension of £3,000 a year for his own and two lives. In the following year, when Pitt's prediction became fulfilled and Spain declared war, he urged the vigorous continuance of the war, by which both France and Spain would perhaps have been totally exhausted; but peace was concluded in 1763. In 1765, Pitt fell heir to the estate of Burton Pynsent in Somersetshire, with a rent roll of £3,000 a year, which was bequeathed him by Sir William Pynsent, a man he had never seen, in acknowledgment of his public services.

Foreseeing the separation of the American colonies from the mother country if the arbitrary measures then adopted should be continued, he advocated a conciliatory policy, and in 1766 lent all the weight of his influence in securing the repeal of the Stamp Act. In the same year he was again called upon to form a ministry, in which he took the office of Lord Privy Seal, and was raised to the peerage as Earl of Chatham. His acceptance of this honor was very unpopular; and in the Upper House he never became the dominating force he had been in the Commons. In the following year suppressed gout disordered his whole nervous system and drove him into intense mental depression; his intellect became clouded; he went into retirement and was inaccessible even to his colleagues in the Cabinet; and so continued until his resignation in 1768. In January 1770 he again denounced the coercive measures employed against the American colonies; from that time till 1774 he was again in retirement; in that and the following year he again pleaded for conciliation, and in 1776 the colonies declared themselves independent. In May 1777 he unsuccessfully moved an address to the Crown praying for a stoppage of hostilities, but he was not willing to recognize American independence. On 7 April 1778, though laboring under severe illness, he appeared at the House on crutches, with his legs swathed in flannel, and made his way to his place; and though plainly not himself, spoke movingly on his old theme, the relations with the American colonies. At the close of the Duke of Richmond's reply he stood up again, pressed his hand on his breast and fell down in an apoplectic fit; and was conveyed to his country seat at Hayes, Kent, where he died a month later. Parliament made provision for his family, his debts were paid and he was honored with a public funeral and a magnificent monument in Westminster Abbey. Another was erected in 1782 at the Guildhall. His popularity in America was very great, and several localities were named in his honor, as well as Pittsburgh, Pa., and Pittsfield, Mass.

Bibliography.— Many biographies of Chatham have been written, but an intimate 'Life' it is impossible to write, as the materials do not exist. He had no intimates, and as Lord Rosebery says, "cut off all vestiges of his real self as completely as a successful fugitive from justice. We know what was around him, the scene on which he played, the other actors in the great drama, and we recognize him on the stage; but away from the footlights he remains in darkness." Consult 'Lives' by Thackeray (2 vols., London 1827); von Ruvelle (English trans. by H. G. Chayter, 3 vols., New York 1907); Williams (2 vols., New York 1913); and Frederic Harrison (New York 1905); his 'Correspondence,' edited by Taylor and Pringle (4 vols., London 1838–40); his 'Correspondence with Colonial Governors and Military and Naval Commanders in America,' edited by Kimball (2 vols., New York 1906); Winstanley's 'Lord Chatham and the Whig Opposition' (Cambridge 1912); Lord Rosebery, 'Chatham: His Early Life and Connections' (New York 1910); and Macaulay's two essays, the most brilliant and the most satisfying brief account of his life and work that has ever been published, and which is never likely to be superseded.

D. S. Douglas,
Editorial Staff of The Americana.

CHATHAM, Canada, city and county-seat of Kent County, Ontario, on the Thames River, the Grand Trunk and the Lake Erie and Detroit River railways, 45 miles northeast of Detroit and 67 miles southwest of London. The Thames is navigable for steamboats from Lakes Erie and Huron. Chatham is trade centre for a rich agricultural, fruit and stock-raising district, and exports large quantities of grain, lumber, railroad ties, cordwood, potash, tobacco, soap and pork. It is the seat of a United States consulate. It has large saw, flour and woolen mills; foundries and machine shops; manufactories of wagons and carriages, soap, candles, potash and tobacco; and breweries and distilleries. Pop. 10,770.

CHATHAM, Canada, county-seat and port of entry of Northumberland County, on the right bank of the Miramichi River, 12 miles from its mouth and one mile from Chatham station on the Chatham branch of the Intercolonial Railway, 98 miles northeast of Fredericton. It is the largest town on the north shore of the province. The harbor accommodates ships of large draught. Chatham has a large export trade in fish, tanning bark, deals, lath and finished lumber. Its manufactories include saw and pulp mills, foundries, shipyard, sash and door factories. The town has many handsome buildings, including two large hospitals, a very fine Central High School and the Ursuline Academy. Its natural attractions include Tecumseh Park, set amid beautiful scenery. It is called the "Maple City," and was incorporated in 1855. Pop. 4,666.

CHATHAM, England, now a parliamentary and municipal borough, naval arsenal and seaport, in County Kent, on the Medway, about 33 miles by rail from London, practically forming one town with Rochester. As a parliamentary borough it includes Gillingham and New Brompton, and returns one member. The great features of Chatham are the naval and military establishments here and in the vicinity. The dockyard was founded by Queen Elizabeth in 1588, and during this reign Upnor Castle, on the left bank of the Medway, was erected to protect the dock and shipping. Despite the fire from the castle, however, in 1667 Van Ghent, a vice-admiral of De Ruyter succeeded in breaking the chain stretched across the river, burned and sank several ships, and retired bearing off the warship, the *Royal Charles,* as a

prize. The former lines of fortifications have been replaced by modern forts. With its recent extensions the royal dockyard now extends for about three miles along the Medway, and is thoroughly equipped with building slips and floating docks, making it one of the most important naval bases in the kingdom. One huge basin has a frontage of 6,000 feet with a width of 800 feet. Up to 8,000 workmen may be at one time employed in and around the dockyard. The military establishments include extensive infantry barracks, and barracks for the royal marines; the headquarters of the royal engineers, arsenal and park of artillery, hospitals, etc. The old convict prison has been partly pulled down and replaced by naval barracks. The fortifications are intended as a defense for London, a protection against an invasion from the south coast. Chatham is one of the chief ship-building towns of England. Charles Dickens lived some time in Ordnance place, Chatham. The remains of a Roman cemetery have been discovered at Chatham. Pop. of municipal borough 42,250; of the parliamentary borough 92,686.

CHATHAM, N. J., borough in Morris County, 15 miles west of Newark, on the Passaic River and the Lackawanna Railroad. It is mainly a residential suburb of New York, Jersey City and Newark, but has important interests in the rose-growing industry of the district. In 1892 it was incorporated as a village and as a city five years later. The electric-lighting plant and the waterworks are municipal property. The government is vested in a mayor and council, elected every year. Pop. 2,000.

CHATHAM ISLAND, the most important of the Galapagos Archipelago (q.v.), 600 miles from Ecuador, which owns the group, and uses Chatham, Charles and Albemarle as penal settlements for political offenders. Chatham Island came into international prominence when unsuccessful negotiations were opened with Ecuador in March 1900, to buy it for a Pacific coaling station.

CHATHAM ISLANDS, in south Pacific Ocean, belong to and are 536 miles east of New Zealand. The group, three in number, area, 375 square miles, are in lat. 44° 7′ S.; long. about 176° 49′ E. The group is of volcanic origin. Chatham, the largest island, is about 38 miles long and 25 broad. The other islands are Pitt Island, 12 miles long by 8 broad; and Ranga Tira, a mere rock. The harbor of Waitangi, on the west side of Chatham Island, is frequented by whaling vessels, which there supply themselves with fuel, provisions and water. There are few hills in the island, and the highest does not exceed 800 feet. In the interior of the largest island is a brackish lake. The soil is in many places fertile, and crops of potatoes and wheat have been successfully and extensively cultivated and exported. Turnips, cabbages, pumpkins and tobacco are also successfully cultivated. The creeks and shores abound in fish, many of them excellent; sharks of formidable size are numerous. Stock raising and seal fishing are prominent industries. The original inhabitants, now nearly extinct, are a cheerful and good-natured race. About the year 1830 they amounted to some 1,200. In 1911 the population was 453 (234 Europeans and 219 Maoris and Morioris); in 1915 the population was 267; of these 171 were males and 96 females. The Chatham Islands were discovered by Lieut. William Robert Broughton, of H.M. brig *Chatham,* and taken possession of by that officer in name of his Britannic majesty, 29 Nov. 1791.

CHATI, chä'tē, a wildcat (*Felis mitis*), ranging from Mexico to Paraguay, in warm lowlands and woods. The body, including the head, is from 24 to 27 inches long, the tail about 14 to 18 inches. The fur is soft and tawny, spotted with black. This cat is by some naturalists considered a variety of the margay (q.v.).

CHATILLON-SUR-SEINE, shä-tē-yôn-sür-sän, France, a town, and capital of an arrondissement in the department of Côte d'Or, 45 miles northwest of Dijon, on the Seine. There are interesting mediæval churches and a castle built by Marmont, which is surrounded by a large park. Napoleon held a congress here with the Allies in 1814. Pop. about 5,000.

CHATMOSS, an extensive morass, area about 6,000 to 7,000 acres, situated chiefly in the parish of Eccles, Lancashire, England. It is remarkable as being the scene of operations for reclaiming bog-land, first successfully carried out on a large scale in the end of the 18th and beginning of the 19th century; also for offering one more field of triumph to George Stephenson, who carried the Liverpool and Manchester Railway over it after all other engineers had declared the feat impossible. Stephenson spread branches of trees and hurdles interwoven with heather on the surface of the bog, and placed a thin layer of gravel over all; upon this sleepers and rails were laid in the ordinary way.

CHATRIAN, shä-trē-äṅ, Alexandre. See ERCKMANN — CHATRIAN.

CHATSWORTH, England, the celebrated estate of the Dukes of Devonshire, situated in the parish of Edensor, in Derbyshire. It was among the domains given by the Conqueror to his natural son, William Peveril. It was purchased in the reign of Elizabeth by William Cavendish, who commenced to build a mansion on it, which was completed by his widow, the Countess of Shrewsbury. Mary, Queen of Scots was imprisoned here for 13 years. The present building was nearly completed by the 1st Duke of Devonshire, and a new wing was added by the 6th duke.

CHATTAHOOCHEE, a river in the northern part of Georgia, rising in the Appalachian Mountains, and flowing first west and then south, forming, for a considerable distance, the boundary between the above State and Alabama. In its lower course, after the junction of the Flint River from the east, it is named the Appalachicola, and is navigable to Columbus for steamboats. Total course, about 550 miles.

CHATTAHOOCHEE STAGE, in American geology, rocks laid down in older Miocene, or according to more recent authorities, in Oligocene time along the Atlantic coast of what was then the continent of North America. Strata of this stage probably extend, except for a break in Maryland and Virginia, from Cape Cod to Texas, and in the north are clays

and uncompacted sand, changing to limestones in the south. See OLIGOCENE SERIES; TERTIARY SYSTEM.

CHATTANOOGA, Tenn., city and county-seat of Hamilton County, an important railroad, trade and manufacturing centre, on the south bank of the Tennessee River, and on the Southern, Central of G., Nashville, C. & Saint L., Cincinnati, N. O. & T. P., Alabama G. S. and other railroads. It is situated near the Georgia and Alabama boundaries, at the base of the Cumberland Plateau, 698 feet above the level of the sea. It is the centre of, and the largest place in, the quadrangle formed by Nashville and Knoxville, Tenn., Birmingham, Ala., and Atlanta, Ga., distant respectively 151, 112, 143 and 137 miles. The lines radiating from Chattanooga terminate in 43 important cities of nine States, and communicate with an area containing one-third of the population of the United States. The district around Chattanooga, as the gateway of the Cumberland Range between the three States, was one of the greatest strategic points during the Civil War, and is historic for many bloody and famous battlefields. To the southwest is Lookout Mountain, commanding a superb view of six or seven States; on the east is Missionary Ridge; and south by east, a few miles away in Georgia, is the field of Chickamauga, now turned by the government into a national military park of 6,000 acres. Adjoining the park is Fort Oglethorpe, a regimental cavalry post in connection with which, for purposes of the World War, there are a regular army camp, medical corps training camp, base hospital, prison for dangerous aliens; also a training camp for line officers, the third group of whom finished the course in April 1918. The medical camp is being enlarged and seems destined to be the chief medical corps training camp of the United States. At the southwest corner of the old city line is a national cemetery, one of the largest in the country, containing 13,362 graves. The whole region is a noted tourist resort, for historic and scenic reasons, served by 98 miles of street railroads, including the celebrated 4,750 feet incline up Lookout Mountain.

Public Buildings.— The city has many fine buildings, among which may be mentioned the Municipal building, costing $200,000; the Hamilton County courthouse, costing $500,000, of Tennessee marble, a beautiful and imposing structure; the Federal building; the James building; the Hamilton building; the *Times* and the *News* buildings; Hotel Patten, costing $1,000,000; Read Hotel; Signal Mountain Inn, which is 2,200 feet above sea-level, although only 40 minutes distant from the business district, with golf, fishing, boating and bathing as amusements; Grand Hotel; Y. M. C. A., costing $150,000; Y. W. C. A., costing $100,000; City High School and Central High School; Carnegie Library; Terminal Station, costing $1,000,000; Volunteer State Life Insurance Company building, costing $500,000; and many beautiful churches. The Baroness Erlanger Hospital, Pine Breeze Tuberculosis Sanitarium, Old Ladies' Home, Vine Street Orphans' Home, Frances Willard Working Girls' Home and Kosmos Cottage are the principal charitable institutions. For higher education the city contains the University of Chattanooga, which has now new and modern buildings made possible by a $500,000 endowment; several preparatory schools, including one for girls; and the Chattanooga College of Law.

Trade and Manufactures.— The river here is navigable eight months in the year, and the Mussel Shoals Canal gives unbroken passage to its mouth by the Chattanooga Packet Company, which operates boats and barges regularly to Ohio River points at a considerable saving in freight over the railroad rates; while northeastward, steamers run to Kingston, and at high water to Knoxville, 200 miles, by water. But the great and growing importance of Chattanooga is in manufacturing, which it owes to its hydro-electric power derived from the Tennessee and Ocoee rivers (cost of plants $15,000,000), and the adjacent deposits of coal, iron (20,000 tons of coal and 8,100 tons of iron ore are mined daily), clays and many other minerals, and the forests. Articles made from wood, iron, steel and cotton can be manufactured more cheaply in Chattanooga than any other place in the South.

The United States Department of Commerce summary for manufactures shows a consistent increase at the census of 1914, as compared with that for 1909. This census covers only the factories in the corporate city; those in the immediate suburbs are large and increase the real totals very materially. In 1914 the value added by manufacture was $9,503,000, and in 1909, $7,602,000, the increase being $1,901,000, or 25 per cent. The value added by manufacture in 1914 formed 48.4 per cent of the total value of products, and in 1909, 47.4 per cent. The salaries and wages in 1914 amounted to $5,461,000, and in 1909 to $3,995,000, the increase being $1,466,000, or 36.7 per cent. In 1914 the number of salaried employees was 1,173 as compared with 972 in 1909, making an increase of 201, or 20.7 per cent. The average number of wage earners in 1914 was 7,085, and in 1909, 6,410, the increase being 675, or 10.5 per cent. The capital invested, as reported in 1914, was $20,615,000, a gain of $4,490,000, or 27.8 per cent, over $16,125,000 in 1909. The cost of materials used in 1914 was $10,149,000 as against $8,434,000 in 1909, an increase of $1,715,000, or 20.3 per cent. The average cost of materials per establishment in 1914 was approximately $36,000, and in 1909 $45,000. The value of products in 1914 was $19,652,000, and in 1909, $16,036,000, the increase being $3,616,000, or 22.5 per cent. These figures cover only the factories in the corporate city. As very many large plants are in the immediate suburbs the industrial statistics of metropolitan Chattanooga are much increased. Chattanooga has a very active Chamber of Commerce with several hundred members; the Chattanooga Manufacturers' Association, embracing 130 of the most important of the city's 300 industries, and housing a permanent exhibit of Chattanooga made goods, showing a majority of the 1,200 varieties made there; the Chattanooga Wholesale Dealers' and Jobbers' Association, Retail Merchants' Association, Builders' Exchange, Business Men's Club, Society of Architects, Rotary Club and other organizations.

Banks.— Chattanooga has 11 banks, including three national banks, representing a total capital and surplus of $5,126,000. During the

year 1909, the bank clearings amounted to $76,882,444.93, while those in 1915 were $120,140,500, or a gain of more than $43,250,000, and in 1917 the total was $205,456,856.

Government and Finances.— Chattanooga has the commission form of government — a board, mayor and four commissioners. The annual expenditures are about $700,000, the heaviest annual item being $100,000 for schools. In 1915 the assessed valuation was $32,000,000, the debt about $3,000,000 and the municipal tax rate 16.50 on a thousand.

Schools, Churches, etc.— Chattanooga's school system has developed with the growth of the city. The pupils number more than 8,300 and the teachers and principals number about 200. Warner Park is the municipal playground. There are 120 churches in the city.

Population and History.— Chattanooga, originally called Ross Landing, first appears in the census in 1860 with 2,545 people. In the Civil War, being a storm centre, it was nearly destroyed; but as in the case of some other Southern cities, the war was its making. It was an important military post, and the iron industry started in a rolling-mill opened in order that the ruined railroads might be rebuilt. The attention of capital had also been called to its great advantages of situation. In 1870 it had a population of 6,093; in 1880, 12,892; and in 1890, 29,100. The growth of the city was retarded by the general business depression which followed the financial reverses of 1893; but a revival came with the concentration of some 70,000 soldiers there in 1898, and the consequent immense disbursements. Since then it has been rapidly moving forward. The 1910 Federal census credits the city with 44,604 people in the corporate limits, and the 1914 official estimate of the census bureau, with 57,000 in the same area. The directory census, multiple two and two-fifths, gives the city and immediate suburbs over 105,000. The incorporated area is less than seven square miles. The increase in school attendance, post-office receipts, bank clearings, deposits, manufacturing, etc., has been very large in recent years. A number of good industries have been added, some, even, during the business depression. One of the greatest elements of success in expanding Chattanooga's industrial life, since the Chamber of Commerce organized a specialized industrial bureau, has been through analyzing the community's needs and encouraging plants to manufacture commodities which have a home market for their products. Some of the important new lines added to the list since the bureau's inception are aluminum salt, stamped enameled ware, box-board paper, glass caskets, roofing, excelsior, handles, shovels, ferro-alloys, skirts, hames and singletrees and breakfast foods. Chattanooga now has more than 300 factories producing over 1,200 different articles. The textile industry is developing in a large way at Chattanooga, the city enjoying its full share of the benefits resulting from the policy of manufacturing cotton near the cotton fields.

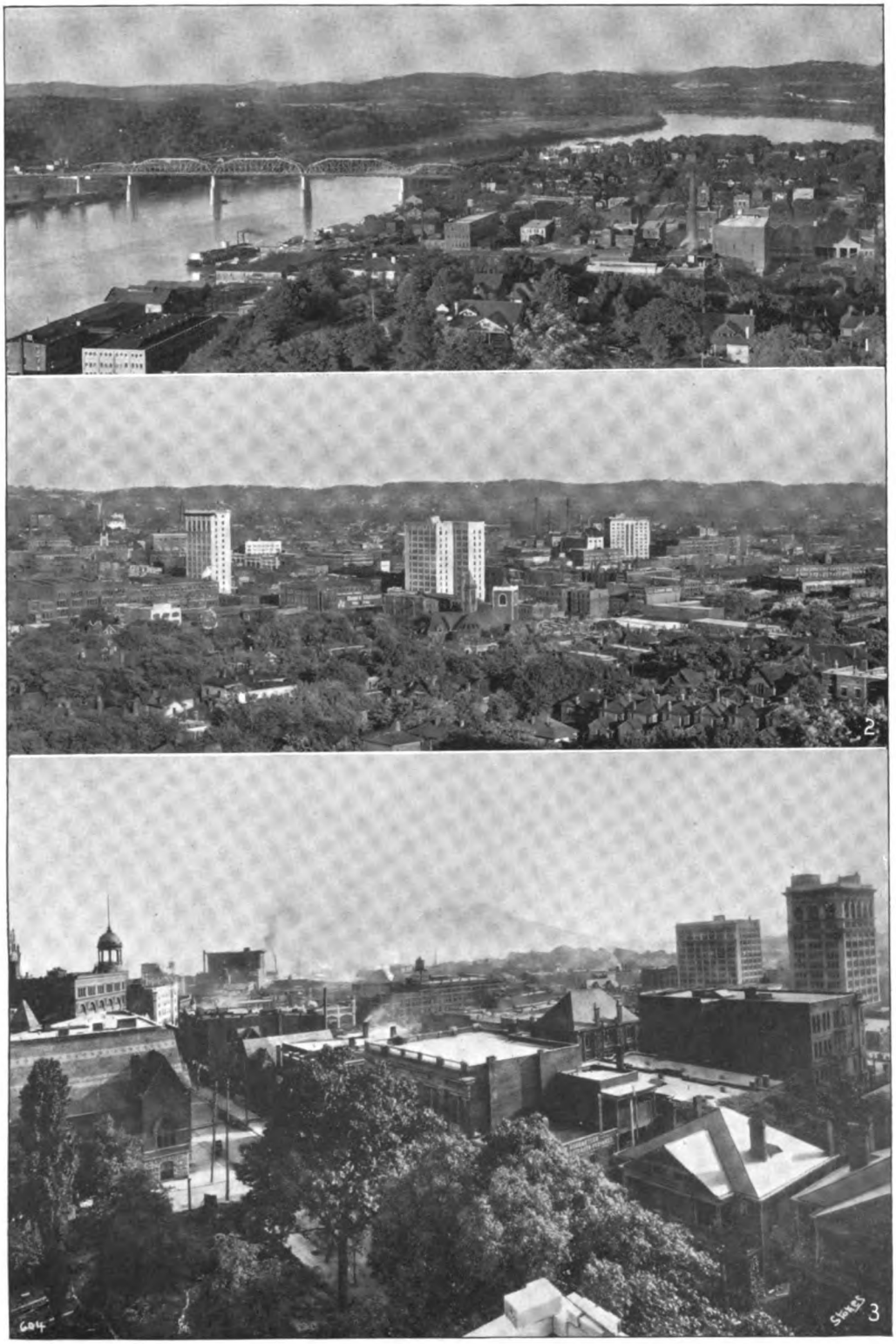
HAL F. WILTSE,
Secretary of Chamber of Commerce.

CHATTANOOGA, Battle of. At the close of the battle of Chickamauga, Ga., 20 September, the Union army, in withdrawing from the field, having interposed at Rossville, Ga., between Bragg and Chattanooga, advanced into that city the night of the 21st and morning of the 22d, and immediately began to fortify it. Bragg followed on the 22d, and his lines were soon established in front of the place, his left resting on the Tennessee River and Lookout Mountain, below the city, his centre extending across the plain to the foot of Missionary Ridge, his right being established at the foot of the ridge and reaching toward the Tennessee River above. The north point of the Lookout Mountain range is three miles southwest of Chattanooga, and Missionary Ridge the same distance east of it, the mountain and the ridge being parallel, running nearly north and south and about four miles apart. The Tennessee River touches the base of Lookout. The city lies to the northeast in a great bend of the river. The advance line of the Confederates was half way between the ridge and the city, upon a low intermediate ridge, at the right of which was Orchard Knob, an isolated knoll rising some 60 feet above the plain.

Lookout Mountain commanded the river line to Bridgeport and Stevenson, the main depots of supply. This necessitated a wagon-haul of 60 miles over the Cumberlands and the adjacent range of Walden's Ridge, all precipitous and barren mountains. The Union army was soon running short of supplies, the fall rains rendering the roads almost impassable. On 19 October, the day that Rosecrans had perfected the general features of a plan for regaining the river line of supplies, he was relieved from command and Gen. Geo. H. Thomas assigned, who at once ordered the preparations inaugurated by Rosecrans to go forward.

Immediately after the battle of Chickamauga General Hooker with the 11th and 12th corps was sent from the Army of the Potomac and arrived at Bridgeport, Tenn., 30 September. Sherman, in camp east of Vicksburg, had been ordered up with four divisions. Grant was sent to take general command. Upon arriving, 23 October, he approved the plans for opening the river, and directed their execution. General Hooker was to advance into Lookout Valley, and a co-operating force from Chattanooga under Gen. W. F. Smith was to seize Brown's Ferry below Lookout Mountain, throw a bridge there and form a junction with Hooker. These movements were successfully executed during 27 and 28 October. The 11th corps (two divisions) and Geary's division of the 12th corps entered Lookout Valley the afternoon of 28 October, the 11th corps proceeding to Brown's Ferry and formed a junction with General Smith's troops from Chattanooga. Geary, with six regiments of his division, halted near Wauhatchie Station. At midnight of the 28th Geary was attacked by Jenkins' (Hood's) division, six regiments, of Longstreet's corps, supported by Law's division. Schurz's division coming to Geary's support, Longstreet's troops after three hours' fighting withdrew to the east side of Lookout, and the Wauhatchie or Lookout Valley remained thereafter in Union control. Abundant supplies by the river then reached Chattanooga by a short wagon-haul from Brown's Ferry. On 4 November, shortly after the battle of Wauhatchie, Longstreet's corps was detached by Bragg and sent to Knoxville.

CHATTANOOGA, TENN.

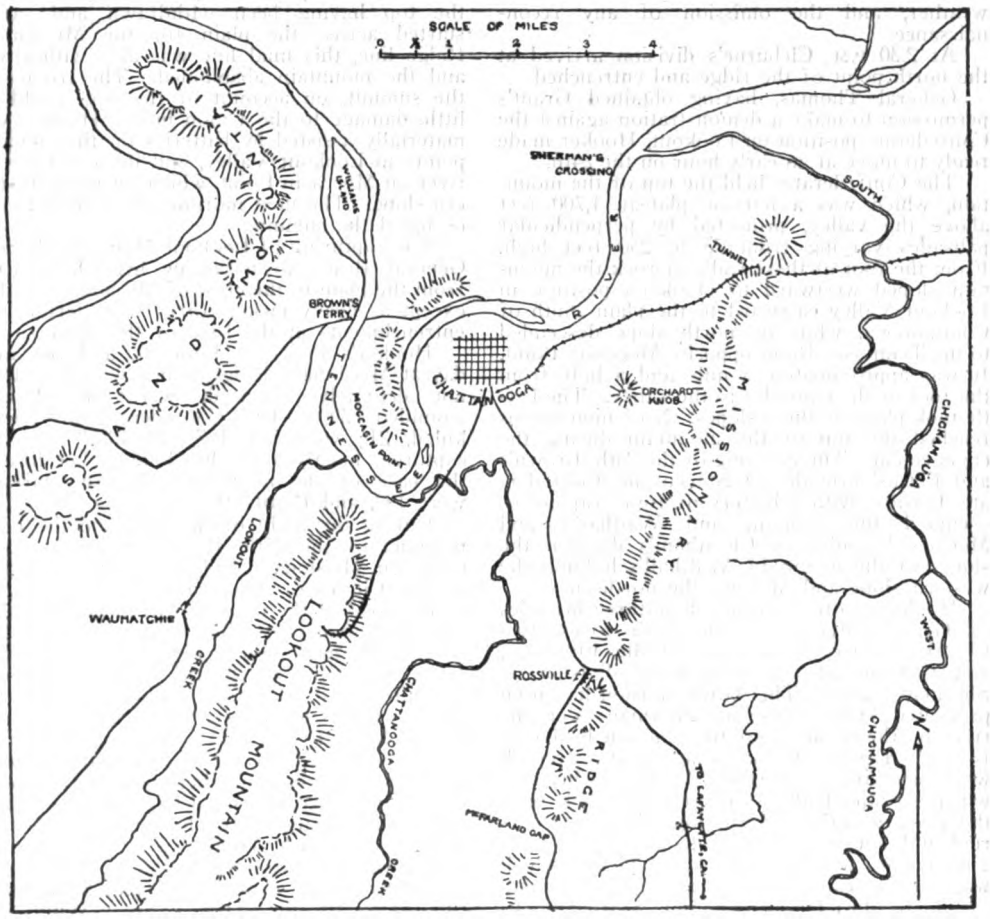


1 View from Cameron Hill, Chattanooga, showing River Front
2 Portion of Business District and Missionary Ridge in Background
3 View of Downtown Chattanooga from the Courthouse

The battle of Chattanooga, which occurred three weeks later, embraced three days' operations, 23, 24 and 25 November. At the opening Bragg's lines were as already described. Hooker, with Geary's division and Cruft's from the 4th corps of the Army of the Cumberland, occupied Lookout Valley, the Army of the Cumberland and the 11th corps were on the lines about Chattanooga, and Sherman with three divisions had crossed at Brown's Ferry and was concealed behind the hills above Chattanooga and on the opposite side of the river from the city.

General Grant's force for his firing lines was sweeping south they were to clear the ridge and the valley. As the engagement progressed, every feature of this plan was changed by unexpected developments.

At noon, 23 November, General Thomas, being directed by Grant to ascertain if the Confederates still occupied their lines and camps between the city and Missionary Ridge, paraded five divisions in full view of the Confederate positions, which, as was afterward ascertained, was at first supposed to be a review. Wood's division was in the centre advanced, Schurz's and Steinwehr's divisions of the 11th corps were reformed on the left, and Sheridan's and



Chattanooga, Tenn., and vicinity.

about 60,000, and the Confederates' a little less than 40,000. The formidable natural positions of the latter were held to give them superior advantages.

Grant's plan of battle was for Hooker to hold Lookout Valley against Bragg's left. Sherman was to cross the Tennessee opposite the north end of Missionary Ridge, which was unoccupied, and carry it to the railroad tunnel about half a mile south of its northern end. Sherman, then, astride of the ridge, was to move south; while Thomas, with the Army of the Cumberland before the city, was to connect its left with Sherman's right, and together Baird's on the right. At a bugle signal at 1:30 P.M. the centre advanced rapidly, and, after a sharp contest, captured Orchard Knob, and forced the abandonment of the entire line of the Confederates through the centre of the plain, reversed the works at and near the Knob and held them. This was the first day's battle.

The night of the 23d Sherman with three of his four divisions which had reached his concealed camps opposite the city and north of it, marched to the North Chickamauga, where 116 pontoon boats awaited him. These were filled with soldiers, floated down the creek to the river and thence to the opposite shore, and by

daylight of the 24th 8,000 of Sherman's troops were in line fronting Missionary Ridge, two miles from it, and opposite its northern extremity, which point was not occupied by the Confederates until 2:30 in the afternoon. At 1 o'clock the three divisions, and one from the Army of the Cumberland which had covered the movement having crossed, the lines were advanced, and at 4 o'clock a range of unoccupied hills north of and overlooking the north end of Missionary Ridge was occupied without resistance, and strongly entrenched under the supposition that these formed the north end of the ridge contemplated in the order of battle. The mistake was due mainly to the misty weather, and the omission of any reconnaissance.

At 2.30 P.M. Cleburne's division arrived at the north point of the ridge and entrenched.

General Thomas, having obtained Grant's permission to make a demonstration against the Confederate position on Lookout, Hooker made ready to move at an early hour on the 24th.

The Confederates held the top of the mountain, which was a narrow plateau 1,700 feet above the valley, protected by perpendicular palisades varying from 75 to 250 feet high. From the foot of these walls of rock the mountain sloped westward to Hooker's position in Lookout Valley eastward to the plain south of Chattanooga, while its north slope descended to the Tennessee River opposite Moccasin Point. It was approximately a mile and a half from the foot of the palisades to the valley. The battle took place on these slopes. No Union troops reached the top of the mountain during the engagement. The morning of the 24th, Brown's and Pettus' brigades of Stevenson's Confederate division, with a battery of four Napoleons, occupied the summit, and Walthall's and Moore's brigades of Cheatham's division the slopes of the mountain, Walthall's holding the western slope and Moore's the northern.

Hooker's forces consisted of three brigades of Geary's division of the 12th corps, two brigades of Cruft's division of the 4th corps, and two brigades of Osterhaus' division of Sherman's army. This latter division had been prevented from following Sherman over the river by the breaking of the pontoon bridge at Brown's Ferry. Hooker's aggregate strength was something over 9,000. Walthall's brigade, which sustained almost the entire attack until the western and northern slopes had been carried, did not number over 1,700. There were 250 men of Moore's brigade on picket, which were mostly captured early in the engagement.

The head of Hooker's column crossed Lookout Creek at Light's Mill near Wauhatchie, at 8 o'clock in the morning, and, concealed by the fog which hung over the mountain, marched directly up the western slope until the head of the line reached the base of the palisades. His line then faced toward the north point of the mountain, distant about two miles.

After an advance of a mile and a half with Geary's brigades, Cobham's, Ireland's and Candy's, in advance, and Whitaker's of Cruft's division in reserve, the troops struck the left flank of Walthall's line protected by slashed timber. This was carried, and in the face of stout resistance the Confederates were driven around the north point of the mountain, and across its northern slope. As Geary's attack opened, first Grose of Cruft's division and next Wood and Williamson of Osterhaus', successively joined the left of the lines, and advanced with the swinging movement on the slopes of the mountain. Until the northern slope had been carried to the Craven House, Walthall had no assistance. Moore advanced as he was being pushed back from the Craven House, but was immediately repulsed. Pettus arrived at 1 o'clock and relieved Walthall after he had withdrawn some 400 yards from the Craven House. This enabled Walthall to procure ammunition, reform and take his place on the line again. This position was held until 3 o'clock in the morning, when, the troops and supplies from the top having been withdrawn and safely started across the plain for the Missionary Ridge line, this final line was also withdrawn, and the mountain abandoned. The troops on the summit, on account of the fog, could do little damage to the Union lines. Hooker was materially assisted by batteries on the elevated points in Lookout Valley, and those across the river on Moccasin Point, which swept the northern slope. The next morning the Union forces occupied the summit.

The capturing of Lookout Mountain decided General Bragg to withdraw his whole army from the plain to the crest of Missionary Ridge, except as heavy picket forces were left in the entrenchments at the base of the ridge.

Hooker's losses at Lookout, and the next day at Missionary Ridge, which were small but not definitely reported, were: killed, 81; wounded, 390. The Confederate loss was: killed, 21; wounded, 177. Walthall lost 845 captured, mostly from his long picket line at the base of the mountain. Moore's missing were 199, and Pettus' 9.

During the night of the 24th and the early morning of the 25th, Bragg concentrated his army on Missionary Ridge, and in the earthworks at its base. This was his first occupation of the crest of the ridge in force. His new line extended from Rossville, a distance of eight miles to the north end of the ridge, his divisions from Rossville northward being Stewart's, Breckinridge's (Bate's), Hindman's (Patton Anderson's), Cheatham's, Walker's, Stevenson's and Cleburne's.

The battle of the 25th opened soon after 7 o'clock by an assault of Sherman upon the north end of the ridge, defended by Cleburne. Sherman's force consisted of his own divisions of Morgan L. Smith, Hugh Ewing and John E. Smith, with the divisions of Jeff. C. Davis from the Army of the Cumberland, and Schurz and Steinwehr of the 11th corps. While the four brigades of Corse, Mathies, Raum and Giles A. Smith reached the crest at different periods, none was able to maintain position there, though Corse and Smith held on stubbornly under the crest until toward evening, when all were driven from the slopes. The fighting of the troops sent in was persistent and most courageous, but Cleburne, at first alone, and later supported by Stevenson's division and a part of Walker's repulsed all assaults. The last one, about 3:30 P.M., was especially serious.

Grant, on Orchard Knob, observing this repulse, ordered General Thomas to advance his four divisions at the centre against the earthworks at the foot of the ridge as a diversion in favor of Sherman, hoping thereby to cause the

withdrawal of Confederate forces from his front. The four divisions which were ranged along the Orchard Knob line were, from left to right: Baird, Wood, Sheridan and Johnson. The line was two and a half miles long, and faced the ridge at distances from three-quarters of a mile to a mile from it. There were 11 brigades and 89 regiments in the lines as prepared for the assault. The formation was such as to present the appearance of being four lines deep. At a signal of six cannon shots from Orchard Knob the four divisions rushed for the earthworks at the foot of the ridge. On the summit opposed to this advance were 13 brigades and 16 batteries. The cannonading of nearly 100 guns from the crest was terrific, and the line was soon under rifle-fire from the works at the base, but the entire line of earthworks was captured as soon as the troops by running could reach them. Reforming their lines in the earthworks, Baird's division on the left and Johnson's on the right began the storming of the ridge without further orders. In Baird's division the horses of field officers had been left behind at the start, because as he announced he had intimations that the intention was to go to the summit, and it was easy to see that the slopes were too steep for mounted men to ascend. In the same way Johnson's men were informed at the start that the movement was to be an attack on the ridge. At the centre in Wood's and Sheridan's divisions the orders as understood by most were to stop at the rifle-pits, but the men ignored these and started forward, and soon orders were received to go to the top. The whole line of brigades gained the crest so nearly together that it has always been difficult to determine which, if any one, was the first.

The long lines of the storming party moved up the slopes with few checks, and in an hour had carried three miles of the crest and captured 37 guns and about 2,000 prisoners.

Just as the orders were given Thomas for this assault at the centre, Hooker, who had descended Lookout at 1 o'clock and started to attack the south end of the ridge in Rossville Gap, reached that position. He had been detained by the necessity of rebuilding a bridge over Chattanooga Creek. He at once sent Osterhaus's division through the gap and turned it north along the east side of Missionary Ridge. Cruft's division assaulted and carried the south end of the ridge in the gap while Geary moved along the western base of the ridge and finally ascended to the crest, reaching it soon after the right of Thomas' assault had occupied it.

As Baird's division reached the crest, it turned northward and became hotly engaged with Walthall's brigade, assisted by Jackson's and Moore's, of Cheatham's division. Darkness coming on, the fighting ceased. Walthall's stand across the ridge had made it possible for Cleburne's, Stevenson's, Walker's and Cheatham's divisions to withdraw in order and unmolested. The centre and left retreated in general confusion, Bate's division, however, soon rallying for a stout resistance as rear guard.

Two myths of the battle have gained general currency. The movements of the Confederate troops which retired from Lookout Mountain and were early sent to confront Sherman gave rise to the report that Bragg was weakening his centre to concentrate against Sherman. But not a single soldier or gun was sent from the centre against Sherman during the day. On the contrary, three brigades, John C. Brown's, George Maney's and Alfred Cummings', were hurried from Sherman's front to resist the assault of General Thomas at the centre.

The second long perpetuated error is that when General Sherman advanced to the unoccupied hills beyond the north end of Missionary Ridge he had carried the ridge to the tunnel as was contemplated in the order of battle. He did not secure any portion of the ridge during the battle, although those troops which were put in fought desperately. Eleven brigades of his force were held as reserves and were not engaged, General Sherman thinking it necessary to guard against an attack upon his left. Bragg was promptly pursued. His rear guard made a stubborn stand at Ringgold Gap, but his army was first rallied at Dalton, where it remained until the opening of the Atlanta campaign in the spring of 1864.

The losses at Chattanooga, including the three days' battles and the affairs in pursuit to Ringgold, were for Grant: Killed, 753; wounded, 4,722; missing, 349; total, 5,824; for Bragg: Killed 361; wounded, 2,180; missing, 4,146; total 6,687. Consult 'War of the Rebellion Records' (Vols. XXX and XXXI, Parts 1 and 2).

H. V. BOYNTON.

CHATTEL (O.F. *chatel*, property), property movable and immovable, not being freehold. The word chattels is originally the same word with cattle, all property being reckoned in early periods by the number of heads of cattle possessed, or their equivalent. The word "capital" also has the same origin. From the fact that cattle were reckoned by the head, it appears probable that they were called *capitalia* (from the Latin *caput*, the head), which became contracted by syncope into *captalia*, and then *catalia*, whence the legal term *catalla*, and our "chattels" and "cattle." Hence the word chattels signified originally only movable property, but in course of time came to be applied to all property not held in feudal tenure. Chattels are divided into real and personal. Chattels real are such as belong not to the person immediately, but dependently upon something. Any interest in land or tenements, for example, is a real chattel; so also is a lease, a rent for a term of years, an interest in advowsons, etc. Chattels personal are goods which belong immediately to the person of the owner, and include all movable property. Chattels usually pass to the executor, except such, for instance, as trees, which may not be severed from the freehold, and therefore pass to the heir. But objects forming part of the real estate may become chattels upon being separated from it, as for example, ore, oil, timber, etc. *Chattels personal*, at common law, are transferable by agreement, when the transfer is made for a consideration; but if the transfer is made through a gift, the delivery of the chattel is necessary to confer title on the guarantee.

CHATTEL MORTGAGE, a transfer of personal property as security for a debt in such manner that upon default the chattel becomes the property of the mortgagee. In the absence of statute no special form is necessary, the terms depending to a great extent on the intention of the parties. Between the parties to a

mortgage, a delivery is not necessary, but to be binding on creditors, delivery to the mortgagee or notice to the creditors is necessary. In mortgage, title and possession pass; in pledge, possession passes, but title remains in the pledgor. At common law it was necessary for the chattel to be in possession of the mortgagor at the time the mortgage was given, so as to be binding against creditors; but if the mortgagor acquired title after the mortgage had been given, it was good as between the parties, but not as to creditors. In equity a chattel mortgage is considered in the nature of an executory agreement. See MORTGAGE.

CHATTERERS, formerly the popular name of certain insessorial birds of the family *Ampelidæ,* genus *Ampelis,* as the Bohemian chatterer or waxwing (*A. garrula*) and the chatterer of Carolina (*A. cedrorum*). Now the *Cotingidæ.* See WAXWING.

CHATTERTON, Edward Keble, English journalist and author: b. Sheffield 1878. He was educated at Oxford, went to London and entered journalism, wrote on art and the drama for several journals; became sub-editor of the *Art Record* in 1902; sub-edited John Ruskin's manuscripts for the Library edition of Ruskin 1902–03; was London correspondent of the Sheffield *Weekly Independent* 1902; sub-editor ot the *Daily Mail* and editor of the *Lady's Realm* 1904–06, and its dramatic critic in 1904–08. In September 1914 he received a temporary commission as lieutenant in the Royal Naval Volunteer Reserve and was appointed to the command of a patrol yacht. His published works include 'T. Sidney Cooper, R. A.: His Life and Art' (1903); 'Sailing Ships: The Story of their Development from the Earliest Times to the Present Day' (1900); 'The Marriages of Mayfair' (1909); 'Modern Journalism' (1909); 'Steamships and their Story' (1910); 'Down Channel in the Vivette' (1910); 'The Romance of the Ship' (1910); 'The Boy's Book' (1910); 'Story of the British Navy' (1911); 'Fore and Aft' (1911); 'Ships and Ways of Other Days' (1913); 'The Romance of Piracy' (1914); 'Daring Deeds of Famous Pirates' (1916).

CHATTERTON, Thomas, English poet: b. Bristol, 20 Nov. 1752; d. there, 25 Aug. 1770. At about 10 years of age he acquired a taste for reading, which became a ruling passion. Melancholy gave way to vivacity and vanity, and dreams of immortality. His father had accidentally obtained possession of a number of old parchments of the 15th century. Many of these were put to domestic uses in the family or served in the making of dolls, but several fell into the hands of Chatterton, who after a few days declared that he had discovered a treasure. He then procured glossaries of the old dialects of the country, and in 1768, when the new bridge at Bristol was completed, he inserted a paper in the Bristol *Journal,* entitled 'A Description of the Friar's First Passing Over the Old Bridge, Taken from an Ancient Manuscript.' He was then but 16 years old. Upon being questioned as to the manner in which he had obtained it, he finally asserted that he was in the possession of several valuable old manuscripts, taken from an old chest in Redcliffe Church. He had been engaged for a year in the composition of several poems, which he attributed to different ancient writers, particularly to one Rowley. In 1769 he ventured to write to Horace Walpole, who was then engaged upon his 'Anecdotes of Painters,' giving him an account of a number of painters who had flourished in Bristol, which Chatterton pretended to have discovered along with several ancient poems in that city, and received a polite answer. Discontented with his situation, he went to London. The favorable reception which he there met with from the booksellers inspired him with new hopes. He wrote for several journals on the side of the opposition and indulged the hope of effecting a revolution, boasting that he was destined to restore the rights of the nation. Failing to procure the rewards which he had expected, his situation daily became worse. Although extremely temperate, and often voluntarily confining himself to bread and water, he was frequently destitute even of these necessaries. At last, after having been several days without food, he poisoned himself in 1770, when not yet 18 years old. His works were extensively read as the public became acquainted with the history of his misfortunes. The most remarkable are the poems published under the name of Rowley, which he composed at the age of 15 years. They display a vigorous and brilliant imagination, fertility of invention and often a deep sensibility. Among the poems which he published under his own name his satires deserve the preference. His prose writings are spirited. Professor Skeat's edition of his poems is one of the best. His collected works were published in 1803. See biographies by Dix (1837), Wilson (1869) and Masson (1875).

CHATTOPADHYAYA, shät-tō'pād-hyā'-yā, **Bankim Chandra,** Indian novelist: b. 27 June 1838 at Katalpara in the District of Twenty-four Pargannas, Bengal, India. Jadav Chandra Chattopadhyaya, Bankim's father, was an official in the service of the government. Bankim Chandra was educated both at Hugli College and at the Calcutta Presidency College. He was the first to receive the B.A. degree from the Calcutta University in 1858. In recognition of his services as a magistrate, the British authorities conferred on him the titles of Rani Bahadur and C.I.E. He was fond of literature even as a boy. At the age of 15, he published a book of poems entitled 'Latit O Manash.' His first novel, 'Durgesh Nandini,' was published in 1864. This book created a literary sensation in Bengal and the author was hailed as a great literary genius. Tagore has won an international fame, but Bankim is called in Bengal, "The Emperor of Bengali Literature." His principal novels are 'Durgesh Nandini,' 'Kapal Kundala,' 'Mrinali ,' 'Bish-Briksha,' 'Chandra Shekhar,' 'Krishna Kanter Will,' 'Debi Chowdharani,' 'Ananda Math,' 'Sita Ram,' 'Raj Singha,' 'Rajani,' 'Indria.' Two of his most important religious books are 'Krishnacharit' and 'Dharmatatwa.' Ever since the advent of the Nationalist movement in India, Bankim Chandra's 'Ananda Math' has become exceedingly popular. This novel deals with the Sannyasi rebellion of 1772. The famous national song of India, "Bande-Matarani," appears in this book. This was used, as it is to-

day, as a rallying cry against the English. The song, in part, reads thus translated:

Mother, hail!
Thou with sweet springs flowing,
Thou fair fruits bestowing,
Cool with zephyrs blowing,
Green with corn-crops growing,
Mother, hail.

.....

Though now seventy million voices through thy mouth sonorous shout,
Though twice seventy million hands hold thy trenchant sword-blades out,
Yet with all this power now,
Mother, wherefore powerless thou?

This song is a source of inspiration to the Nationalists of India. In his literary life, Bankim Chandra was influenced by Iswar Chandra Vidyasagar. And Bankim influenced Rabindranath Tagore. In elegance of language and in loftiness of thought, Bankim's novels can be counted among the very best in any literature.

CHAUCER, châ'sẽr, **Geoffrey,** English poet, "the father of English poetry": b. London about 1340, probably rather after than before; d. 1400. The traditional date for his birth, 1328, is disproved by known facts in his life. His father, John Chaucer, a wine-merchant, was known to the court, and therefore was able to obtain for his son a position as page in the household of the Countess of Ulster, daughter-in-law of Edward III; here we first learn of Geoffrey, in 1357, and here he may have acquired much of his rather extensive though not very methodical education, besides accomplishments and experience. In 1359 he served in the war in France; he was taken prisoner, but was ransomed in 1360 for a sum which indicates powerful and appreciative friends. Throughout his life he frequently received pensions and gifts from the Crown and from John of Gaunt. During the next decade, while he was in the twenties, we know little of him, except that during part of the time at least he was at court as Yeoman of the king's chamber, an office which doubtless required more dignified social as well as humble domestic duties. In or before 1366, probably, he married; his wife, Philippa, was a damsel of the queen's chamber, and was almost certainly a sister of Katherine de Swynford, who lived in various capacities, finally as wife, in the household of John of Gaunt. This marriage doubtless strengthened the tie which we know existed between the poet and the Prince, though there are indications that Chaucer's wedded life was not altogether comfortable. During this time Chaucer must have written more or less poetry on French models; little of it has survived, however. Chaucer was not a precocious poet. From 1370 to 1380 he went on numerous diplomatic missions to the Continent, which he seems to have discharged with tact and judgment. Of these journeys those to Italy are of particular interest. On the first he was absent for six months in 1372 and 1373, with three or four months in Genoa and Florence and perhaps elsewhere; his main business was to arrange for an English port to receive Genoese trade. The numerous attempts which have been made to prove that he may have met Petrarch in Padua are opposed by a great weight of probability and evidence. He certainly learned the Italian language, and must have brought home Italian manuscripts. In 1378 he was in Lombardy for a month or two conducting negotiations with the noted *condottiere* Sir John Hawkwood and with the Lord of Milan. In 1374, between the two journeys, he received the office of comptroller of the custom and subsidy of wools, hides and wool-fells in the port of London, which kept him closely applied to its duties for nearly 11 years, except when he was away, so much so that at this time he rented a house built on the city-wall over Aldgate, 10 minutes' walk from the custom-house. In 1382 he received an additional customs office and in 1385 permission to discharge his duties through a deputy. It was probably in consequence of this that he moved into the quiet country, down the river at Greenwich whence he would come up to town, when occasion required it, by boat with the tide or on horseback. By nature vivid in energy and interest, he lost no time in devoting part of his new leisure to public duties. In 1385 he became justice of the peace for Kent and in 1386 was elected to represent the county in Parliament. Chaucer's intimate attachment to the court party is illustrated by the fact that during the years 1386–89, when Richard II was deprived of absolute power, Chaucer was in misfortune; in 1386 he lost his custom-house positions, and for a time was clearly in straitened circumstances. In 1387 his wife seems to have died. With the return of the royal party to power in 1389 Chaucer's fortunes revived, and he received the office of clerk of the king's works at Westminster and elsewhere. This he held only two years, and from then till his death little is known of his occupations. At times, in spite of pensions and the like, he seems to have been again in hard circumstances, was several times sued for debt, and wrote more than one poetic appeal for aid. In 1399 he rented a house in the garden of Westminster Abbey for a term (oddly) of 53 years or until his death. On 5 June 1400, the records of the payment of his pensions cease, and there is no reason to doubt that he died late in that year, as has always been understood. It was his burial in the south transept of Westminster Abbey, followed two centuries later by that of Spenser, which has made that the "Poets' Corner." To judge from a more or less authentic portrait of him produced under the direction of his disciple Hoccleve, and from his description of himself in the 'Canterbury Tales,' he was short of stature, fair, and late in life rather stout. Everything testifies to his charm of personality and character.

The most convenient and essential thread by which to trace Chaucer's literary development is the growth of his originality. The usual division of his works into French, Italian and English periods is misleading and contradicts the facts. We may fitly begin with his translation of the 13th century French amorous and satirical allegory 'Le Roman de la Rose,' which he mentions in the 'Legend of Good Women,' and which we know he produced earlier than 1386, probably by many years. The extant incomplete Middle English translation was never attributed to Chaucer until 1532, but there is good reason to believe that of its three fragments the first, consisting of 1,705 lines, may be by him; whether his version originally was longer we do not know. It is certain that

the French poem influenced him strongly for many years, by its vision-form, its allegory and its park-like scenery; and longer yet by its tales, its satire and its pithy sayings. His first important original and first datable poem is the 'Book of the Duchess,' written in 1369 to commiserate John of Gaunt on the death of Blanche, his first wife. It is undeniably pretty and fanciful, but it is strongly under the influence of 'Le Roman de la Rose' and other artificial French poetry, is ill-proportioned and is far from the directness and naturalness of Chaucer's later literary manner. Had he died in 1370 he would be obscure and probably unknown as a poet. Other poems which may date from much the same period, since they show no Italian influence and little originality, are the 'Complaint to Pity,' which shows him as a poetic lover in the artificial French mode, and the 'A. B. C.,' translated from Deguilleville, which shows piety toward the Virgin Mary. His prose translation of the 'De Consolatione Philosophiæ' of the late Roman philosopher Boëthius, though usually deemed much later, may date from 1370–72.

Chaucer's three or four months in Italy in 1373 gave him literary breadth, independence and ideals. Before this, the only literatures with which he shows familiarity are the ancient Latin and the French. But the conditions, traditions and manners of poetry among the Romans were so different from those of Chaucer's own day and land, and his own temperament was so unlike that of the ancient Latin poetry which he had read, that he could respond to it far less readily than, for example, Dante did. The literary tradition which it was inevitable that he should begin by following was the French. But mediæval French poetry was in general either undignified and extemporaneous in manner, like the romances, or artificial, like the allegory. In Italy, in the works of the three great 'Trecentisti,' especially Dante and Boccaccio, he found literary work which was contemporaneous in its interest but which had assimilated what the Romans had to teach,—Christian and romantic poetry written in a modern language which was more like poetic English than French was, and of a more dignified yet natural character than was usual in French. It was inevitable that for a time he should be greatly under its influence; even though certain French modes and influences abode with him until the end, and though the differences between his two masters tended finally to free him from the domination of both and to leave him independent.

The most important of Chaucer's poems based directly on the Italian is his longest single poem, the 'Troilus and Criseyde.' There seems to be strong reason to deem it also the first, written 1373–77, though it is usually regarded as dating from about 1380–83. This story, of Criseyde's slow acceptance of Troilus' love, and quick transference of hers to Diomed, is a very free translation and expansion of Boccaccio's psychological epic 'Il Filostrato,' to which it must be admitted that much of the merit of Chaucer's poem is due. The traditional story is a mediæval outgrowth on the Troy-saga; Criseyde is ultimately the same person as Homer's Briseis, but her love-story first appears in Benoit de Saint Maur's 12th-century French poem 'Le Roman de Troie.' Less than a third of Chaucer's lines are translated from the Italian, and he has made important changes in the characterization and some in the plot. The poem is too long and its analysis of emotion frequently fine-drawn and stagnant, but it shows humor, much sympathetic penetration and skill in dialogue and in situation, and has been called one of the most beautiful long poems in the language.

Chaucer's next important poem was probably the 'House of Fame.' It shows markedly in detail and sometimes in plan the influence of Dante's 'Divina Commedia,' though it should hardly be called an imitation or parody of it. The poet in an allegorical vision is carried by an eagle through interstellar regions to the dwelling of Fame, where he learns of the capriciousness of that goddess. The poem is ill-proportioned, rambling and sometimes confused and pointless, but in a high degree is free, fanciful and humorous. Of special interest are the glimpses it allows us of Chaucer's own circumstances and way of life. It is usually assigned to about 1384, but may have been written as early as 1379.

Much the same merits, without some of these faults, make the 'Parliament of Fowls' one of the most attractive of Chaucer's lesser poems. It is almost certainly a complimentary celebration of the betrothal of Richard II to Anne of Bohemia, and would therefore date from 1381. The noble female eagle represents the future queen; of the three male suitors, the noble tercelet of course is the King, and the other two are two German princelings, for her marriage to whom during her early childhood there had been negotiations, which for literary reasons Chaucer makes contemporaneous. The poem is rich in its imagery, fanciful though not wholly original, in its plan, realistic in its humor and melodious in its verse (especially the roundel at the end).

Two other early poems Chaucer later included in the 'Canterbury Tales,' in each case without obliterating traces of their earlier history. The first is the 'Life of Saint Cecelia,' now the 'Second Nun's Tale.' This sweet and sympathetic but rather crude and unnatural legend of martyrdom was derived from the 13th century Latin prose 'Legenda Aurea.' The far more important 'Palamon and Arcite,' which took the first place among the 'Canterbury Tales' as that of the Knight, is a condensed adaptation of Boccaccio's epic 'Il Teseide.' It may probably have been written about 1384–86; assuredly not very much earlier. The idea, long current, that it was written early in the form of seven-line stanzas, and was recast in the couplet-form for the 'Canterbury Tales,' is disproved by both probability and evidence. An outgrowth on the Greek story of Thebes, the poem narrates the rivalry of the imprisoned Theban princes for the love of Emily, the sister-in-law of Theseus. It is less intensive and psychological than the 'Troilus,' but is a brilliant romance of picturesque incident, now gay, now pathetic, and (for all its Athenian location) one chief source whence modern romantic writers drew their ideas of mediæval pageantry.

Among Chaucer's minor works, written at various times, mention should be made of several. 'The Complaint of Mars' is probably an allegory on a certain court-scandal. The

GEOFFREY CHAUCER

fragmentary 'Anelida and Arcite,' noteworthy for the great metrical skill shown in the 'Complaint' near the end, represents Chaucer's earlier use of Boccaccio's 'Teseide,' whence the first part is drawn, and may have been written about 1383–84. The little poem called 'Chaucer's Words unto Adam' upbraids his careless copyist with amiable raillery. The charming 'Former Age' is based on a passage in Boëthius. The prose treatise on the 'Astrolabe,' written in 1391, and based on a Latin version of a treatise by the Arabian Messahala, instructs the writer's little son Lewis in the use of that astronomical instrument. Of ethical and gnomic *balades* the best are 'Truth' and 'Gentilesse.' The two *balades* addressed to 'Scogan' and 'Bukton' are vivacious and satirical; both men were courtier-friends of Chaucer's, and it is curious to learn that the latter of them lost no time in flouting the poet's advice not to marry, and wedded within two or three months of the writing of the poem. The triple rounded 'Merciless Beauty,' which we can hardly doubt is by Chaucer, is no less musical and clever in metrical form than animated and jolly in substance. The 'Complaint to His Purse,' addressed to Henry IV and therefore dating from 1399–1400, may be the last poem which Chaucer wrote, but certainly shows no failing of spirits or powers. Of other "balades, roundels, virelays" we have Chaucer's own word for it that he wrote many, most of which unhappily have perished. It should be remarked that several works attributed to Chaucer in old editions, such as 'The Flower and the Leaf,' and the 'Mother of God,' are not by him.

'The Legend of Good Women,' the poet's first attempt at the kind of composite poem at which he made his great success in the 'Canterbury Tales,' marks the culmination and transcending of his conventional and French style. It dates probably from 1386–87; there is no reason to connect it with any incidents of 1385, as was formerly done. It consists of a prologue and the "legends" of 10 classical heroines. In the former the poet, after expressing his passionate devotion to the daisy, is upbraided by the God of Love for having written such anti-feminine works as the 'Troilus' and the 'Romance of the Rose,' and is instructed by Alcestis, the mythical Greek heroine, who accompanies the god, to make amends by celebrating ladies who have been faithful to false men. The prologue is now known to be based largely on the poems of three 14th-century French writers, but with amazing vigor Chaucer vivifies the conventions which he borrows, and produces a poem full of fresh love of nature, biographical interest and quaintly pretty pageantry, which has charmed other poets from the 14th century to Keats and Tennyson. The "legends of Cupid's saints" which follow are largely drawn from Ovid; Chaucer wrote them with less sympathy than the prologue and appears to have wearied of their gloom and monotony. It is most probable that Queen Anne is celebrated in the prologue under the double guise of the daisy and of Alcestis. It is extant in two very different versions, of which "B," usually printed second, is now known to be the earlier-written; "A" was probably produced in 1394 or 1395, after the Queen's death, and its cooler tone is due to the excision of the probable references to her.

From his sense of confinement in the 'Legend' Chaucer emerged directly, in 1387, into the multifarious freedom of the 'Canterbury Tales,' the greatest collection of narrative poems in the world's literature. The "frame-story," as it is often called, many subordinate tales fitted into a main narrative, is of Oriental origin, but was familiar in mediæval Europe; Boccaccio's 'Decamerone,' often wrongly assumed to have been Chaucer's model, is only one of several such collections, and it is most unlikely that Chaucer was familiar with it. Nor is there any good reason to suppose that the poem originated in any actual pilgrimage made by the poet. His design is no less original than it is simple. At the Tabard Inn, Southwark, on 16 April, about 30 pilgrims assemble, drawn from every class of middling English society, and the day after set forth on their 60-mile ride, lasting four or (more likely) three days, to the tomb of Saint Thomas à Becket in Canterbury Cathedral, one of the most popular shrines in mediæval Europe. The host of the inn proposes that by way of pastime they shall tell tales on the ride, and that on their return the teller of the best shall be given a supper,—at his own inn, he is careful to stipulate. These pilgrims are described with immortal charm in a 'General Prologue,' which probably dates from 1387 and is Chaucer's greatest work; its combination of sparkling realism, pungent satire, rich and delicate humor, penetrating knowledge of human nature and of the world, catholic and democratic sympathy, graphic and pithy style and abundant and essential poetry has never been equaled. Of the pilgrims about a third are connected with the Church, and of them Chaucer has little good to say, except for the Clerk and the humble but upright Parson, the perfection of whose character atones for all of Chaucer's satire on the Church. Among the others, the poet writes with a particular fondness of the military class, represented by the Knight and his young son; and with tolerant satire and an unerring eye for typical features, of the professional and mercantile classes.

Chaucer's original plan called for two tales from each pilgrim on the journey to Canterbury and as many on the return, together with an account of their experiences during and after the pilgrimage. Of this prodigious design he completed only about a fifth, 24 tales in all, several being incomplete, scattered over the whole journey to Canterbury. Most of the tales are connected with each other by passages, usually called prologues and "links," in which the narrative of the pilgrimage is carried on, and which contain some of the best and liveliest writing in the poem. Several of the characters, such as the Pardoner and the Wife of Bath, reveal their own views and characters with extraordinary frankness; between others there are lively quarrels; tiresome tales are twice broken off by weary auditors; as the party is nearing Canterbury they are joined by a rascally canon who makes a dishonest living by feigning to practise alchemy, and whose servant, after frightening his master away by his indiscreet loquacity, entertains the company with a tale of another such impostor; throughout, commenting and keeping things harmonious and lively, moves the burly, canny figure of Harry Bailey, Host of the Tabard Inn, the self-appointed "personal conductor" of the party.

Of the tales each is in general admirably adapted to the person who tells it; the pious tell of religion, the soldiers of chivalry, the vulgar of licentiousness. Most of them fall into well-recognized classes of mediæval narrative poetry. The tales of the Knight, Squire, Wife of Bath and Franklin are romantic; Chaucer himself, as a character on the pilgrimage, tells the burlesque romance of 'Sir Thopas,' tactfully unwilling to compete seriously among his own creations; the tales of the Miller, Reeve, Cook, Shipman, Sumner, Merchant, Canon's Yeoman and Manciple are (or are of the nature of) *fabliaux*, more or less drastically realistic and often very coarse comic tales; those of the Man of Law, Monk, Pardoner, Friar and Clerk are moral tales of various kinds; the tale of the Nun's Priest is a marvelously witty beast-fable; the Physician's is the Latin story of Virginia, ultimately from Livy; the Prioress', of the Christian child killed by the Jews, and the Second Nun's, of Saint Cecelia, are saints' legends; Chaucer's second tale, of Melibeus and his moralizing wife, Prudence, is a didactic prose-work; as is the Parson's, on the sacrament of penance and the seven deadly sins, introduced at the end because it seemed fitting to approach the holy city "in some vertuous sentence." Hardly any of the tales are original in their groundwork; originality in plotting was even less regarded as desirable in the Middle Ages than by Shakespeare; and they are of various and remote origins. The tales of the Squire, Merchant and Pardoner are ultimately Oriental; those of the Manciple (Ovid's tale of the talking crow) and Physician are from the classics; the Clerk's ideal and pathetic story of patient Griselda is from Petrarch's Latin version of the last novel in Boccaccio's 'Decamerone,' just as the Knight's is from the latter's 'Teseide'; the Wife of Bath's, Man of Law's, Clerk's and perhaps Franklin's are more or less rationalized fairy-stories, perhaps originally Celtic; the Monk's patterned after Boccaccio's 'De Casibus Virorum Illustrium,' is drawn from the Bible, Roman writers, Boccaccio and others; most of the *fabliaux* are probably developed from short humorous French poems; for the Canon's Yeoman's no parallel has been found, and it may be based on fact; the Nun's Priest's is based on some branch of the Old French 12th-century animal-epic 'Le Roman de Renart'; the story of Melibeus comes, through the French, from the Latin of the Italian Judge Albertano of Brescia; and the Parson's is from some *rifacimento* of works by two theological writers, Raymond of Pennaforte and Peraldus.

Chaucer probably worked on the 'Canterbury Tales' to near the time of his death. The order and dates of the writing of most of them have not been determined, but there is little reason to believe that any except the Knight's and Second Nun's antedated the beginning of the poem as a whole. It is clear that the order in which they are now printed is far from being the order in which they were written; that the work was extended and filled in at various times and in divers manners, and that it was by a continuation of this process of inserting tales and joining them by links that Chaucer intended to complete the poem and make it continuous. In gradually building up the work Chaucer did not cover his tracks, and in several cases a change of plan is evident, for he was not always a careful polisher and reviser. A study of the 60 or more manuscripts of the poems shows a probability that by supplying the connecting links he had drawn the work together, at the time of his death, into eight volumes or continuous fragments unconnected with each other (not wholly the same as the nine "groups" in modern editions, which do not seem quite to fit the facts), but that even they were by no means put in their final form. Chaucer's intentions as to arrangement can be pretty well discovered by references to times, tales already told and such places along the road as Rochester, Sittingbourne and the Bleau Forest, but for every group of tales he may not have decided on the position, and the arrangement of modern editions may represent rather what he would have done than what he did. Some parts of the work were certainly known to the world before the author's death, and others may have been; but it seems very unlikely that the poem as a whole, as we have it, was put forth otherwise than by Chaucer's literary executors. The arrangement of none of the manuscripts can agree with his intention, and there are many other evidences that his death determined, as it were, a fortuitous cross-section of the growing work. The 'Canterbury Tales' therefore remain the most unfinished and fragmentary of great poems.

Chaucer might well be characterized as an intellectual man of the world. Interested, but not absorbed, in things purely of the reason and the soul, he drew his inspiration chiefly from literature and human life. With science and pseudo-science he was rather well acquainted, especially with alchemy and astrology, although naturally skeptical, he seems to have believed in neither. In philosophy and theology he shows no great interest, except in the question as to the relation between chance, free-will and foreordination. There are indications that he sympathized with some of Wyclif's teachings; but they no more show that he was a thorough Lollard than his occasional flippancy shows that he held "agnostic" views. There are signs that before his death he became even narrowly devout, and throughout he was probably faithful enough to the Church. It was for poetry that he cared rather than for speculation, and in it he was well and widely read. English poetry was too unoriginal and meant for too rude an audience to appeal to him; he probably read it little, and never mentions it except for ridicule. He, like other educated people, almost confined his reading to Latin and French, with the weighty addition, in his case, of Italian. Ignorant of Greek, like all his contemporaries, he derived most of his knowledge of the ancient world from Boëthius, Virgil, Ovid, Statius and a dozen or so of other Roman writers. Among later Latin writers, he was somewhat familiar with Saint Jerome, Saint Augustine and other Fathers, and with many ecclesiastical, didactic, satirical and historical writers of the Middle Ages, most of whom habitually wrote in Latin. Among these works are several by Boccaccio, with whose Italian poems we have noted already Chaucer's intimacy, as with Dante's 'Divina Commedia;' with Petrarch he was less familiar, though he knew his sonnets. With French literature he was intimate, especially the allegorical and the

lyric; the romances he knew, but their thin extravagance did not greatly appeal to him. In his best days, what he derived from literature was chiefly an ideal of style, his plots and occasional ornament. What makes his poetry vital and individual,—characterization, vivid episode and situation, descriptive touches of people and things, vivacious and penetrating side-thrusts or *obiter dicta*, humorous and satirical lights and flashes,—he derived from his intense interest in life, and his vast endowments of humor and observation. His most characteristic humor consists in odd juxtapositions of ideas and in the bold, spontaneous minuteness of his naturalness. The pleasurable effect of all is doubled by his spirit of *bonhomie*, tolerance and charity. The licentious character of some of his tales is due in part to the frankness of the time, in part to his dramatic instinct for the sort of tale which certain characters would be likely to tell, in part to his hearty appreciation of humor wherever found. He was not naturally romantic, but naturalistic, and investigation shows more and more that the faithful and brilliant reflection of contemporary conditions in his works, especially the 'Prologue' of the 'Canterbury Tales,' is quite equal to his nice observation of characteristic acts and habits. The thoroughly romantic and idealistic character of most of the literature and art of the Middle Ages throws Chaucer's individuality into high relief, and gives the modern a peculiar sense of kinship with him.

Chaucer's style carries on the tradition inherited by the later Middle Ages of a poetry orally sung or recited, yet modified by the more dignified manner which he learnt from the Italians. Hence his combination of informality with amenity, which gives him a magically gracious ease. It is this, with his perfect freedom from artifice, with his complete frankness, his instinct for a situation, his readiness to vary his mood, and his knowledge of what to select and (usually) what to omit, that makes him a consummate narrative-poet. Of all English versifiers he is one of the most melodious, provided a reader understands the chief differences between Middle and Modern English,— that the vowels have their Continental sounds, that in general all letters are pronounced (including especially the final *e*) and that many French words are still accented on the last syllable. His chief verse-forms, in order of date and increasing excellence, are the 8-syllable couplet, the 7-line stanza and the 10-syllable couplet; the two latter he was the first to use in English, having adopted and perfected them from the French.

Chaucer is frequently called "The Father of English Poetry," and the title is perhaps better deserved than such epithets usually are. While he stands at the end of a long evolution in a more real sense than at the beginning of another, the former line was not a native one. His was the dominant literary influence in England and Scotland during the barren century and more after his death, and he, his contemporary and friend John Gower, and his disciple John Lydgate, were repeatedly named as the three glories of English letters. At the end of the 15th century, the 'Canterbury Tales' were twice printed by Caxton and twice by others; in 1532, William Thynne brought out the first fairly complete edition of Chaucer's works. In the 16th century, as well because, owing to rapid changes in the language, his vocabulary seemed archaic and his verse unmelodious, as because the direct influence of Italian and ancient literature came in, his influence decayed. Nevertheless, especially in regard to style, it was strong upon Spenser, who calls him, in celebrated phrase,

> "Dan Chaucer, well of English undefyled,
> On fames eternall beadroll worthie to be fyled."

In the 17th and early 18th century there was a tendency not to take him very seriously, but he delighted and sometimes influenced Shakespeare, Milton, Dryden and Pope. Late in the 18th century, with the development of an interest in the past, in part romantic and in part historical, reviving appreciation of Chaucer was indicated and stimulated by the treatment of him in Warton's 'History of English Poetry' (1774) and by the admirable edition of the 'Canterbury Tales' by Thomas Tyrwhitt (1775–78; several times reprinted). His influence is more or less traceable on Wordsworth, Scott, Keats, Longfellow, Morris and Tennyson, to mention no others. Within the last 40 years knowledge of Chaucer has been added to and interest in him enlivened by the work of very numerous editors, investigators and critics, not only in England, America and Germany, but even France and Italy; notably Child, Furnivall, Skeat and Ten Brink. See CANTERBURY TALES; TROILUS AND CRISEYDE.

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JOHN S. P. TATLOCK,
Professor of English, Philology, Leland Stanford Junior University.

CHAUDIÉRE, shō'dē'yâr', **LAKE** (Fr. caldron or place of boiling water), an expansion of the Ottawa River just above the city of Ottawa. It is noted in Indian legend and tradition, and the name Chaudière is, in this case, said to be a literal translation of the original Indian designation of this lake.

CHAUDIÉRE RIVER, a river of Canada, which has its rise in Maine, near the source of the Kennebec, and flows north for 120 miles and joins the Saint Lawrence about six miles above Quebec. Between two and three miles above its mouth it forms the Chaudière Falls.

CHAUFFEUR, shō-fėr' (Fr. a "stoker) This term has recently come into use in the English language to designate at first the engineer or motorman of a steam-driven road carriage; but by extension it is now applied to any professional machinist who operates an automobile, electrically or otherwise propelled. During the Reign of Terror in France the word was applied to members of a band of outlaws who infested the northeastern portion of the kingdom. They were led by John the Skinner. They garroted men and women and tortured others in efforts to make them disclose hidden treasure. The band was not suppressed until 1803.

CHAULMOOGRA, châl-mŭg'ra (*Taraktagenos Kurzii*), a tree of the order *Flacourtiaceæ,* which grows in eastern countries, and from the seeds of which an oil is obtained that has been long known and highly valued in India and China as a remedy in skin diseases. The oil has been introduced into Great Britain, and is said to be useful in rheumatism, sprains, etc. It has been used as a specific for elephantiasis and leprosy. Recent experiments seem to bear out its value in the treatment of the latter disease. Chaulmoogra oil was formerly supposed to come from *Gynocardia odorata.*

CHAUMONOT, shō'mŭn'ō', **Pierre-Joseph** Jesuit missionary: b. near Châtillon-sur-Seine, France, 1611; d. Quebec, 21 Feb. 1693. In 1632 he entered the Jesuit novitiate at Rome and in 1639 arrived at Quebec. He labored on the Huron missions under Brébeuf. After the latter's death, Chaumonot was deputed to conduct 400 Hurons to Quebec and he established them on a reservation on the Isle of Orléans. Later he was sent with Dablon on a mission to the Onondagas of New York. Here he spent two years, being obliged at last to fly with the other priest and 50 colonists to avoid a general massacre. He returned to Canada and thereafter devoted himself to his Huron converts. He established the famous Christian settlement, known as Lorette, which after shifting several times was located finally on the river Saint Charles where it still exists. Consult Charlevoix, 'History of New France' (New York 1872).

CHAUMONOT, Pierre Marie, French pioneer missionary: b. 1611; d. 1693. His father was a vine dresser who committed the care of his son to his brother, who was curé at Châtillon. Pierre ran away at the age of 10 in order to prosecute the study of music at Beaune, Burgundy. In the course of a pilgrimage to Rome he came under the notice of the Jesuits, who induced him to become a member of their order and sent him as missionary to the Indians of Canada in 1639. He was first assigned to the Huron missions at Ossossane, where he collected material for a Huron dictionary. In 1640 he accompanied Brébœuf to a tribe living between Lake Erie and Lake Ontario and to the west of the dreaded Iroquois; the mission resulting in failure Chaumonot went to Saint Michael where he remained for eight years until the settlement was destroyed by the Iroquois. Chaumonot took the surviving Hurons to an island in Lake Huron and later to the Isle of Orléans. In 1655-58 he was stationed at Onondaga in the Iroquois country, and in the latter year removed to Montreal. He returned afterward to spend his last days with the Hurons. Consult his autobiography (1688; New York 1858); Thwaite's 'Jesuit Relations' (72 vols., Cleveland 1901).

CHAUMONT-EN-BASSIGNY, shō-môn, France, the capital of the department of Haute Marne, on a height between the Marne and the Suize, 145 miles southeast of Paris by rail. It is well built, has a fine town-hall, courthouse, communal college, public library, church dating from the 13th century, the ruins of a castle belonging to the counts of Champagne, and an iron bridge 1,960 feet long with 50 arches on which the railway crosses the Suize. There are manufactures of gloves, wax candles, hosiery, cotton, cutlery, leather, woolens, sugar, etc.; and a trade in grain, coal and in the iron and iron goods of the department. Here was signed, March 1814, a treaty between Great Britain, Russia, Austria and Prussia, in which these powers pledged themselves to accomplish the overthrow of Napoleon and restore peace to Europe. Philip Le Bon, the first who advocated the use of gas for illumination, in France, was a native, and his memory is honored by a bronze statue. Consult Jolibois, 'Histoire de la ville de Chaumont' (Chaumont 1856). Pop. 14,870.

CHAUNCEY, Isaac, American commodore: b. Black Rock, Conn., 20 Feb. 1772; d. Washington, 27 Jan. 1840. He commenced his career in the merchant service, in which he became distinguished for seamanship, enterprise and energy. He entered the navy as lieutenant in 1799, and early in 1802 was appointed acting captain of the frigate *Chesapeake,* the flagship of a squadron ordered to the Mediterranean to

operate against Tripoli. In the brilliant operations before Tripoli in 1804 he bore a distinguished part. In April 1806 he was promoted to the rank of captain. In the War of 1812 the naval superiority on the lakes became an object of high importance, and Commodore Chauncey, then in command of the navy yard at Brooklyn, was appointed to command on all the lakes except Champlain. He commanded the Mediterranean squadron 1816–18 and negotiated the treaty of peace with Algiers.

CHAUNCY, Charles, American clergyman and educator and second president of Harvard College: b. Yardleyburg, England, 1592; d. Cambridge, Mass., 19 Feb. 1672. He was educated at Trinity College, Cambridge, where he became professor of Greek and of which he was afterward a fellow. From 1627 to 1633 he was vicar of Ware, and of Marston Saint Lawrence from 1633 to 1637. In both these relations he was in frequent conflict with his ecclesiastical superiors, first for substituting catechetical exercises for the prohibited afternoon sermon, and in 1629 for asserting that "idolatry was admitted into the Church," and "there is much atheism, popery and heresy in the Church." In 1635 he was again before the Court of High Commission for objecting to the act of kneeling at the communion service. After the trial he publicly recanted. He came to America in 1638 and preached in Plymouth for three years. From 1641 to 1653 he was pastor at Scituate. In 1654 he was arranging to return to his former charge at Ware when he was chosen by the overseers of Harvard to succeed President Dunster. From this time until his death he was president of Harvard. In addition to volumes of sermons he published 'The Doctrine of the Sacrament, with the Right Use Thereof' (1642); 'The Plain Doctrine of the Justification of a Sinner in the Sight of God' (1659); 'Antisynodalia Scripta Americana' (1662). Consult Fowler, 'Memorials of the Chauncys' (Boston 1858) and Cotton Mather, 'Magnalia' (London 1702).

CHAUS, kā'ŭs, the common short-tailed jungle cat of southwestern Asia (*Felis chaus*), so called in India, where it wanders from the forests into sugar-cane plantations and marshy fields, in search of game birds, mice, etc. It varies from yellowish to dark brown in color, and when adult is unspotted. This wildcat has contributed to the mixed ancestry of eastern domestic cats (q.v.).

CHAUTAUQUA, shà-tâk'wa, a popular educational centre on Chautauqua Lake in the southwestern part of New York State. The controlling organization is a corporation "not for profit," conducted for educational purposes by a board of trustees. The property comprises about 200 acres on the upland terraces above the lake, at a high elevation, although lying in a lowland corner of the State. Chautauqua is 70 miles south of Buffalo, 200 miles north of Pittsburgh and 450 miles west from New York. It is reached by the Pennsylvania and Erie railways. Chautauqua has numerous large and commodious school buildings on a hilltop with a beautiful lake environment; several thousand cottages in the woods; an hotel called "The Athenæum"; about 40 smaller houses for the boarding accommodation of the public; a few shops or "stores"; a so-called "Hall of Philosophy," which is a Greek temple with supporting pillars of masonry, open to the summer breeze, and seating 3,000 people; and a vast amphitheatre dug out of a hillside, but well roofed, well lighted by electricity and capable of seating 5,000 or 6,000. There are only about 500 permanent residents in Chautauqua. For nine months of the year it is a town of 1,000, but during the summer, while the classes are being held, has a population ranging from 20,000 to 50,000.

As an educational institution Chautauqua has become a centre of great importance. It may be considered primarily as an educational adaptation of the open-air public assembly such as the American mass-meeting or town-meeting, or the religious camp-meeting. The Chautauqua assembly was established by Bishop Vincent and Lewis Miller in 1874 at Fairport for Bible study and the training of Sunday school teachers. But the ideal and purpose of the assembly were gradually broadened; and to the specifically religious study a great variety of subjects were added. The religious spirit, however, still holds an important place in the work of the assembly. The best exponent of the spirit of the institution was its chancellor, Dr. John H. Vincent. He infused into it the idea that all sound learning is sacred, and that the secular life may be pervaded by religion. The work done at Chautauqua has been thus summarized in one of the New York State bulletins: "For the many there are popular lectures, concerts, entertainments; for a somewhat less number there are philosophical, scientific and literary lectures in progressive courses; for the comparatively few are provided means for careful study under able and well-known instructors." The work may be further classified as follows: (1) School of English Languages and Literature; (2) School of Modern Languages; (3) School of Classical Languages; (4) School of Mathematics; (5) School of Sciences; (6) School of Education; (7) School of Social Science and History; (8) School of Library Training; (9) School of Home Economics; (10) School of Music; (11) School of Arts and Crafts; (12) School of Expression; (13) School of Physical Education; (14) School of Practical Arts. An important part of Chautauqua's influence is made effective through classes and courses for home study offered by the Chautauqua Literary and Scientific Circle (C.L.S.C.), founded in 1878. The C.L.S.C. is a well-directed system of home reading in literature and science, carried on in connection with local reading circles, and practically aided by many good suggestions in a monthly bulletin, the *Round Table*. The course of reading occupies four years. Each year is devoted to one particular nation, the four being known as the "Modern European Year," the "Classical Year," the "English Year" and the "American Year." No attempt is made to teach languages or any of the exact sciences. The textbooks on England and the United States, Greece and Rome, and other subjects, social and economical, are prepared by good writers representing American colleges and universities. With the regular courses in history are combined literary courses and studies in art, sociology and natural science. In the American year the subjects are American history, literature, government, diplomacy, social

institutions and the like. The course of reading is carried on by Chautauquans at home, but once a week they meet in social circles in neighborhoods and villages all over the country and, under the best local guidance they can find, devote an evening to the discussion of topics suggested and to other private reading. The total enrolment of Chautauqua readers has been about 400,000. By far the larger number fail to complete the four years' course, but it is estimated that about half have done consecutive reading for two years. A "saving remnant" of about 75,000 continued to the end and have won a simple certificate. The graduates are also encouraged to form local educational clubs and continue special study.

The "Chautauqua idea," of which much has been said and written, is best expressed by Bishop Vincent, who said: "Chautauqua pleads for universal education; for plans of reading and study; for all legitimate enticements and incitements to ambition; for all necessary adaptations as to time and topics; for ideal associations, which shall at once excite the imagination and set the heart aglow. . . . A college is possible in everyday life if one choose to use it; a college in house, shop, street, farm, market, for rich and poor, the curriculum of which runs through all of life, a college which trains men and women everywhere to read and think and talk and do . . . this is the 'Chautauqua idea.'"

CHAUTAUQUA, Jewish, an institution founded in 1893 by Rev. Dr. Henry Berkowitz of Philadelphia, and incorporated in 1899, with a body of officers representing the chief cities in the United States for "the dissemination of a knowledge of the Jewish religion by fostering the study of its history, literature, etc." The departments for study and entertainment are modeled on those of other Chautauqua. This society has about 3,000 members, divided into various sections. Its courses include preparatory, two years, with readings in Jewish history and literature; Bible, four years; and special courses in post-Biblical history and literature, 'Jewish Characters in English Fiction,' 'Beginners' and Advanced Hebrew.' Its chief work of late years has been embodied in its summer assembly, at Atlantic City, N. J., which is held annually in July and lasts three weeks. It includes a summer school, popular lectures and conferences, literary and social entertainments, in which many prominent speakers participate. During the annual session the condition of religious schools, dependent and delinquent children, how to relieve congestion in large cities, the status of the Jews of Russia, the attitude of Jewish university students toward Jewish problems, are the topics discussed. The average attendance at the morning sessions is from 150 to 350 persons and at the evening from 300 to 800 persons. During the summer of 1903 an English organization on the plan of the Jewish Chautauqua was formed at Ramsgate and is now known as the London Jewish Society. Until 1907 its official organ was the *Menorah Magazine* (New York) and there is also the *Assembly Record* (Philadelphia) and special series of various publications. Consult the *Menorah Magazine* (New York 1897–1907); 'Annual Reports' of the United States Commissioner of Education; and 'Special Series No. 7' of the Jewish Publication Society (Philadelphia 1902).

CHAUTAUQUA LAKE, a beautiful lake situated in Chautauqua County, N. Y. It is 18 miles long and from one to three miles wide, the highest navigable water on the continent, 730 feet higher than Lake Erie and 1,400 feet above the sea-level. Chautauqua was the Indian name for this lake, the shores of which are a natural "divide" between waters which flow northeastward with the Saint Lawrence from the Great Lakes district and waters which flow southwestward to the Mississippi River and the Gulf of Mexico. On its banks is the village and summer resort of Chautauqua, the centre of a religious and educational movement of large and growing interest. See CHAUTAUQUA.

CHAUVEAU, shō'vō', **Pierre Joseph Olivier,** Canadian statesman, orator and educationalist: b. Quebec 1820; d. 1890. He became a journalist at 17, was called to the bar, entered Parliament in 1844 and held portfolios in the government. In 1855 he was appointed chief superintendent of education for Lower Canada, and in 1857 founded the 'Journal de l'Instruction publique.' He was first premier of the province of Quebec under Confederation, 1867–73, and was speaker of the senate, 1873–74.

CHAUVEAU-LAGARDE, lä gärd, **Claude François,** French advocate: b. Chartres 1756; d. 1841. He studied law in his native town and began to practise in Paris shortly before the outbreak of the Revolution. He became celebrated for his eloquent defense of those on trial in the Reign of Terror. He was the advocate of Marie Antoinette at her trial and also of Charlotte Corday. Others of his clients were Brissot and Madame Elizabeth of France. His defense of Mirandola saved the latter from the scaffold. In 1814 he was ennobled by the government of the Restoration and two years later he published an account of the trial of Marie Antoinette and Princess Elizabeth.

CHAUVENET, shō'-vē-nā', **William,** American astronomer and mathematician: b. Milford, Pa., 24 May 1819; d. Saint Paul, Minn., 13 Dec. 1870. He was graduated at Yale in 1839, and became professor of mathematics and astronomy at the United States Naval Academy in 1845 and was the first director of the observatory there. He was made professor of astronomy at Washington University, Saint Louis, in 1859. In 1862 he became chancellor of the last institution. He wrote 'Spherical and Practical Astronomy,' 'Elementary Geometry' and similar works. Consult 'Memoir of William Chauvenet' (in the 'Biographical Memoirs of the National Academy of Sciences,' Washington 1877).

CHAUVINISM, shō'vĭn-ĭzm, a French word derived from Nicolas Chauvin, a soldier of the French Republic and of the First Empire. His name became a synonym for a passionate admirer of Napoleon, and the word Chauvinism was formed to signify the almost idolatrous respect entertained by many for the first Emperor, and generally any feeling of exaggerated devotion, especially of patriotism. A vaudeville, 'La Coquarde Tricolore,' in

which there was a character named Chauvin, with a song that became immensely popular, fixed the word in the French language. The word is now used to express exaggerated patriotism of an aggressive type, jingoism.

CHAUX-DE-FONDS, shō'-dė-fôn', **LA,** Switzerland, town in the canton of Neuchâtel, and nine miles northwest of the town of Neuchâtel, in a deep valley of the Jura, at an elevation of 3,070 feet above sea-level, and is regularly built, with broad, straight streets, and stone houses. The most notable structures are the aqueduct, 13 miles long; the Protestant church with a fine, vaulted roof; the hospital; the college, which contains the municipal picture gallery; the historical museum; and the library. Among the educational institutions is a watch-making and art-engraving school. Chaux-de-Fonds and the neighboring village of Locle are the chief centres of watch-making in Switzerland; and also manufacture articles in gold, silver, bronze and enamels, lenses and scientific instruments. Watch and clock making was begun here in 1705 by Jean Richard. Pop. 39,507.

CHAVES, shä'vĕsh, Portugal, the ancient AQUÆ FLAVÆ, town of the province of Tras-os-Montes. The fortifications which once defended it are now in ruins. It is situated on the Tamega River, here crossed by a Roman bridge, 12 arches of which remain out of the original 18, and has hot saline springs and baths. It has a interesting church, the burial place of Alfonso I, Duke of Braganza. Linen and silk manufactures are carried on in the town. In 1811, after a violent conflict, Soult obtained possession of the place; and after the defeat of the Carlistas, 18 Sept. 1837, the famous Convention of Chaves was signed here. Pop. 6,463.

CHAY-ROOT, chī-, or **CHOY-ROOT,** choi-, the roots of a small Rubiaceous plant of Hindustan, *Oldenlandia umbellata,* extensively cultivated on the Coromandel coast. The roots yield a dye which is used as madder.

CHAYOTE, chī-ō'tā, a climbing vine (*Sechium edule*), belonging to the *Cucurbitaceæ,* or gourd family. The leaves are strongly three-angled or lobed, with the broadly cordate base also showing two or four sharp corners. They are deeply cordate, have a rough surface with whitish veins and in color are of a deep fresh green. The pistillate flowers are solitary; the much more numerous staminate flowers are borne on special branches. Pollination takes place through the agency of insects. The ovary is always one-celled, with a single ovule. It is mealy-pubescent when young, becoming spiny with maturity in some varieties. The mature fruits are always more or less compressed, as though built over the large flat seed. In general they are pear-shaped but vary in their proportions. They weigh from eight ounces to a pound each and fruits weighing three pounds have been reported. In flavor they resemble summer squash or vegetable marrow. The chayote is produced in large quantities in Porto Rico for domestic consumption and it has recently attained popularity in Australia and Algeria, from which latter country many hundreds of tons are shipped annually to Paris and London. It bears shipment well, an 8- or 10-day journey not affecting its condition. It is in common use as a vegetable in Madeira, Mexico, Central America, the West Indies, California and Louisiana. It was first reported in Europe by Francisco Hernández, who found the plant in Mexico about 1560 and described the fruit as suggesting the flavor of roasted oysters, sweet potatoes or chestnuts. It produces tuberous roots which resemble the yam or cassava. In Mexico the young shoots are sometimes boiled and eaten like asparagus. Both the fruit and the vine are used as fodder for cattle and hogs, and the vines are sometimes used for fancy basket-work and the manufacture of women's hats. The flowers yield an abundance of nectar and are said to be of value to bees. As an ornamental vine the chayote takes high rank, a single vine being reported as covering a fence 6 feet high and 50 feet long in a few months.

The fruit is eaten in a variety of ways — boiled and seasoned with pepper and salt; parboiled and fried; stuffed and baked; in puddings, tarts or fritters, etc.

The name appears to be a form of the Aztec word *chayotl,* meaning "a head bristling with spines" or a "squash covered with thorns." The popular names are in many cases corruptions of the Aztec term, as the Porto Rican *tayote;* but in the West Indies and Australia it is known as *chocho;* in Louisiana as *mirliton;* and as "vegetable pear" in some parts of the British West Indies.

CHAZARS, chā'zärz, or **KHAZARS,** a people of the Finnic stock known in the 7th century on the shores of the Caspian; in the 9th century their kingdom occupied the southeast part of Russia from the Caspian and the Volga to the Dnieper. Their capital was long at Astrakhan, called by them Balandshar. They were singularly tolerant of all religions, Jewish, Christian and Moslem; and a large part of the nation formally adopted the Jewish faith from Jews who fled from the prosecutions of the Emperor Leo. It is not improbable that the modern Jews of Russia have at least an admixture of Chazar blood. Cyril converted many to Christianity in the 9th century. The power of the Chazars was broken in 965 by Sviatoslav. In the early part of the next century the destruction was completed by the Byzantine emperors and the Russians.

CHAZY, shā-zē, STAGE, in American geology, the limestone beds, 725 feet thick, typically developed at Chazy, N. Y. The name was first applied by the New York geological survey. The Chazy limestone was laid down around the border of the old Pre-Cambrian land in Canada and New York in older Ordovician time. It succeeds the Calciferous or Beekmantown and is succeeded by the Lowville. Though a well-marked division in New York and Canada, it is not determined farther west, but the Saint Peter sandstone, which underlies the so-called Trenton limestone in Iowa, Michigan and Wisconsin, may be of Chazy age. See ORDOVICIAN.

CHE-KIANG, chē-kē-äng', or **CHE-CHIANG,** China, a maritime province lying north of Fu-kien and south of Kiang-su and including the Chusan Archipelago; area, 39,150 square miles. The province is of great commercial

importance, containing three treaty ports, Ning-Po, Wan-Chau (Wen-Chow) and Hang-Chau (Hang-Chow) all of which are connected with Shanghai by a railway under British control. The surface is mountainous and traversed by rivers, notably the Tsien-Tang and Ta-Kia, which run down to the Eastern Sea. The Grand Canal, which has its gateway in Che-Kiang, affords the only means of internal communication apart from an extensive system of narrow foot roads. Trade in silk and tea is well developed, this province being, with Chiang-Su and Fu-Shien, the first to contain a treaty port, that of Ning-Po, opened in 1844. Beside tea and silk the province produces cotton and sedge for hats and mats, rice, ground-nuts, wheat, indigo, tallow and beans in abundance. It imports opium, cotton and woolen goods, tin and iron, kerosene oil, indigo and sugar. Coal is found in the north and iron ore in the south, and there are traces of copper, but none of these minerals exists in sufficiently large deposits to make mining remunerative. Che-Kiang is famed for its native system of education. It contains the great religious and literary centre of China, Hang-Chow (not to be confused with Hang-Kow or Han-Kow), where thousands of candidates yearly resort for the public examinations. Hang-Chow is also the capital of the province, which is ruled by a viceroy. Marco Polo visited Che-Kiang in the 14th century, when it contained beautiful temples, now in ruins. The most magnificent architectural feature of the province is the temple of the Queen of Heaven, dating from 1680. Che-Kiang suffered severely during the Tai-ping rebellion in 1861. The Italians in 1900 laid claim to part of Che-Kiang as a sphere of influence and demanded the privilege of establishing a port on the coast to be called San Mun. There are thousands of native Christians. The population is estimated at 18,800,000. The foreign population is estimated at about 2,750.

CHEAT. See BROME GRASS.

CHEAT RIVER, a river rising in the Alleghanies in West Virginia, and after the union of its four forks, flowing north and then northwest to empty into the Monongahela a few miles beyond the boundary line of Pennsylvania. Its length is about 150 miles.

CHEATHAM, Benjamin Franklin, American Confederate soldier: b. Nashville, Tenn., 20 Oct. 1820; d. there, 4 Sept. 1886. He served as captain of volunteers in the Mexican War, distinguished himself at Monterey, Medelin and Cerro Gordo, and, after the expiration of his 12 months' term of service, was again mustered in as colonel of the Third Tennessee Regiment and served till the end of the war. He was major-general of Tennessee militia after his return, and was a farmer until 1861, when he entered the Confederate army, being one of the first Tennesseeans to enlist in that service, and was early appointed a brigadier-general. He commanded at Mayfield, Ky., in September 1861, and at the battles of Belmont and Shiloh, served subsequently at Columbus, Ky.; was a division commander in Bragg's army when it entered Kentucky in September 1862, was soon after promoted major-general and was engaged at Perryville and Stone River, being wounded in the second battle, and at Chickamauga and Chattanooga, Nashville and other places. President Grant, who was his personal friend, offered him an appointment in the civil service, but he declined. He devoted himself chiefly to agriculture after the war, but served four years as State superintendent of prisons, and in October 1885 became postmaster of Nashville.

CHEBOYGAN, shĕ-boi'gan, Mich., city and county-seat of Cheboygan County, on Lake Huron and on the Michigan Central and the Detroit and Mackinac railroads, at the eastern end of the Straits of Mackinaw. It became a city in 1886 and is governed by a board of 10 aldermen. It has a good harbor, connected with lake ports by regular steamship lines. It is an agricultural centre, a popular summer resort and manufactures lumber, paper, leather and furniture and there are large tanneries, canning factories and shipyards. It has nine churches and an excellent public school system. Pop. 6,859.

CHECK or **CHEQUE,** a draft or bill on a bank, payable on presentation. A check may be drawn payable to the bearer, or to the order of someone named; the first form is transferable without endorsement and payable to anyone who presents it; the second must be endorsed, that is, the person in whose favor it is drawn must write his name on the back of it. A person who obtains money or a check which he knows is drawn by one not entitled to draw for the amount specified therein is guilty of fraud and liable to criminal punishment. Prompt payment is demanded of a check; it is not for use as a continuing security. In case of delay, the drawer is not relieved of his obligation to the holder unless he suffers actual damage through the delay; as for instance, through the failure of the bank on which the check was drawn. Certified checks may also be obtained from banks in the United States. This has effect on the drawer's liability, depending on whether it is procured by the holder or by the drawer. When procured by the former, the drawer and endorsers are freed from liability; when procured by the drawer he remains liable on the check.

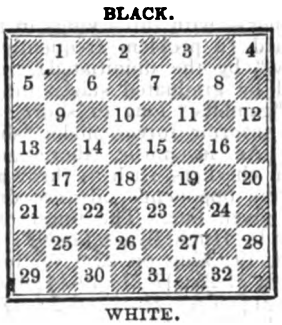
In England the custom of crossing checks is common. This is accomplished in two ways, (1) by a general crossing, (2) by a special crossing. A general crossing makes it payable only when presented through a bank, but any bank will do. A special crossing names the bank by which the check must be presented. A check may be crossed either by the drawer or by the holder, who may convert a general into a special crossing. Only bankers have the privilege of crossing a check which has already been twice crossed. A check which is crossed either generally or specially may further be crossed by the words "not negotiable," which means that the person who takes it with these words on it does not obtain and is not capable of giving any better title to the check than that which the person from whom he took it had. A check so crossed is on very much the same footing as an overdue bill of exchange.

CHECKERBERRY. See GAULTHERIA.

CHECKERED BEETLE, a beetle of the sericorn family *Cleridæ*, so named because of

its markings. Some are ant-like in form and coloration. The adults are found on tree trunks and in flowers, where they subsist on sweet sap and nectar. The larvæ live under bark and feed on wood-boring larvæ. Some invade hives of the honey-bee and devour the young bees. For a synopsis of the North American species consult *Annals* of the Lyceum of Natural History of New York (Vol. V, New York 1849).

CHECKERS, chequers or draughts; Fr., jeu de dames; Germ., Damenspiel; Ital., giuoco di dama; Sp., juego de damas; Arab., la'ab ed-dama: a game of skill played by two persons on the familiar board — divided into 64 squares. The pieces or "men" used are 24 wooden (bone or ivory) discs, 12 black and white (or red). For purposes of recording games and moves the squares are numbered as shown in the diagram:



As the game is usually played on the dark squares, it must be noted that in printed diagrams the white squares are invariably used to indicate the position of pieces — as in problems — and for numbering. Only 32 of the squares (the half) are used in checkers; but whether the dark or the light squares are used in play, each player must have the double corner of that color at his right. The black pieces are arranged on the squares 1 to 12: this is called "the black side"; the white pieces on those numbered 21 to 32, which is called "the white side." The vacant squares 13 to 20 form the preliminary battle-ground. The general rules are simple. Black always has the first move, and at the beginning of each successive game the players change colors, taking alternately the black and the white pieces. The pieces are moved forward diagonally one square at a time except in jumping, when a piece may cover as many as six squares in one move. Each piece as it reaches the extreme opposite side of the board becomes a "king" and is "crowned" by having another piece of the same color placed on top of it. The king can move forwards or backwards — always diagonally — one square at a time, except, as before, in jumping. By arranging the board it is possible for a king to jump nine pieces. A man can never jump more than three. The capturing piece jumps over the man "en prise" to a vacant square beyond, and may continue to jump as many pieces in its path so long as there is a vacant square behind each. When a "man," i.e., not a king, jumps a piece or several pieces and lands in the opposite king-row, the move is ended; he cannot move or jump out again until the other side has made a move. A king, however, can jump into a king-row and right out again so long as there is any piece in position to be taken. The theory of the jump is simple: Place the 24 men ready for play; black moves 11 to 15; white responds by moving 22 to 18, and black must jump over that piece from 15 on to square 22, taking the man on 18 off the board. The black piece now on 22 is liable to capture by the white pieces on 25 and 26: either 25–18, or 26–17. The former is the correct jump, 25–18, and the black piece is captured and removed from the board. This is a "level exchange," i.e., one for one. These moves form the "single-corner" opening, than which no other offers so great a scope for attack or defense. For many years, indeed, it was the only opening checker players knew of. When a piece is touched it should be moved if possible. Keeping a finger on a piece that has just been moved does not confer the right to move that piece back again at will; no move once made can be withdrawn except by consent of the opponent. When a player has a "jump" in which two or more pieces can be captured, and the hand is withdrawn from the capturing piece before all the men possible have been taken, the move is completed; in other words, the player cannot retrieve the omission. When a player has a "jump" before him and fails to take it by making some other move instead, the opponent has the choice of one of three methods: (1) he can "huff" the piece that should have made the jump, i.e., take it off the board as a penalty; (2) he can compel the player to take his wrong move back and make the jump, or (3) if it suits his game, he can let the error stand as if it had not occurred. A "huff" is no move; the player entitled to do so must "huff" first and then make his move; if he makes his move first (overlooking the "huff") he cannot take the "huff" afterward. The "huff" is a peculiar movement. As there should be no talk whatever during a checker game, a player "huffing" picks the offending piece off the board, passes it near his mouth and blows upon it — just like blowing out a match — and places it on his side of the table. The "huff" is not generally employed except in match play, where the rules are very strict and every move is timed by special clocks.

Contrary to general — and superficial — opinion, checkers is as profound and scientific a game as human ingenuity ever devised. "Everybody plays checkers, but there are few checker players." Some of the greatest experts, men who had spent 50 years and more in studying the mathematical intricacies of the game, have finally confessed that they had "only begun to touch the fringe of the subject." Yet checkers is a game well worth cultivating on account of the mental faculties it calls into play; it imparts a fascination all its own, for its main principle is to arrive at an object by the most direct and decisive methods. Neither in regard to antiquity nor as an exercise in mental gymnastics need the game of checkers yield the palm to its more ornamental sister game, chess. In Butcher's translation of the 'Odyssey' we read that when the goddess Athene descended from the heights of Olympus and reached the gate of Odysseus, "she found the lordly wooers . . . taking their

pleasure at draughts in front of the doors." Checkers and chess are "both unfathomable and beyond the comprehension of the human mind" (Henry Spayth). Edgar Allan Poe goes a step further and boldly asserts that "the higher powers of the reflective intellect are more decidedly and more usefully taxed by the unostentatious game of draughts than by all the elaborate frivolity of chess" (Murders in the Rue Morgue). The average chess problem declares a white win or mate in two or three moves, and not infrequently contains 10 white pieces as against three or four black ones. On the other hand, the famous "second position" in checkers by Andrew Anderson contains three pieces a side — a king and two men each — equal forces, with an apparent "safe draw." Black, men on 3, 6; king on 1; white, men on 12, 13; king on 8. Black to move and win. If at the sixth move white goes 15–19, the shortest way by which black can win requires 79 moves all told; if white instead goes 15–11, it takes no fewer than 83 moves (counting both sides) for black to force a win. If black makes one mistake in 42 moves, the result is a draw. In a problem by Mr. H. D. Lyman, with a king and three pieces a side, altogether 63 moves are necessary for black to win, and every white move is forced: black men on 1, 3, 28; king on 21; white men on 5, 12, 20; king on 29; black to move and win (No. 948 in Gould's). Again, Strickland's position (3 pieces to 4) and Bowen's "Twin" (4 to 4) require 55 moves each to win. Without previous study of these positions, it would be quite beyond the intellectual range of any checkerist to discover the correct moves under playing conditions. There are 49 classified two-move openings in checkers; the variations of many of them run into hundreds (E. T. Baker's book on the "Alma" opening alone gives upward of 500 variations; and P. Ketchum's "Flora Temple" branches of the "single-corner" opening gives over 280 variations). The principal openings are: the Dundee, formed by the first move, 12–16; Bristol, 11–16; Kelso, 10–15; Denny, 10–14; Double Corner 9–14; Edinburgh, 9–13; Switcher, 11–15, 21–17; Single Corner, 11–15, 22–18; Cross, 11–15, 23–18; Second Double Corner, 11–15, 24–19; Ayrshire Lassie, 11–15, 24–20; Dyke, 11–15, 22–17, 15–19; Will o' the Wisp, 11–15, 23–19, 9–13; Defiance, 11–15, 23–19, 9–14, 27–23; Centre, 11–15, 23–19, 8–11, 22–17, 15–18; Fife, 11–15, 23–19, 9–14, 22–17, 5–9; Glasgow, 11–15, 23–19, 8–11, 22–17, 11–16; Laird and Lady, 11–15, 23–19, 8–11, 22–17, 9–13; Maid of the Mill, 11–15, 22–17, 8–11, 17–13, 15–18; Old Fourteenth, 11–15, 23–19, 8–11, 22–17, 4–8; Souter, 11–15, 23–19, 9–14, 22–17, 6–9; Whilter, 11–15, 23–19, 9–14, 22–17, 7–11. As the openings develop after the second move they receive auxiliary titles, e.g., Kelso-Switcher, Kelso-Choice, Kelso-Exchange, Kelso-Cross, Kelso-Regular, Kelso-Double, Kelso-Side, etc. Other developments are the Boston Cross or Waterloo, Tillicoultry, Wagram, Paisley, Pioneer, Drummond, Nailor, etc. A gambit is a form of strategy in the early stages of a game in which a piece is sacrificed for position.

Within the limits of this article it is only possible to indicate briefly the beginner's road to checkers. Let him number a board as in diagram, marking each square at bottom left-hand corner, so that the numbers will be visible when the squares are occupied. With a guide-book on the game — wherein every move is numbered — it will be easy to follow the directions. In this practice the white squares would be used; in playing with an opponent, however, the board must be half-turned to bring the dark double corner to each player's right. The black squares may then be used. The best opening to begin learning is the "single-corner." To play a good end-game the 1st, 2d, 3d and 4th positions should be mastered, with a few of the simpler problems and early traps, such as the "goosewalk," etc. The "calculation of the move" requires some study and a good memory; it is useful only in end-games when there are five pieces a side or less. A knowledge of this theory is often a winning advantage. The "tricks" of the board are innumerable; beginning with the easy ones of overcoming one king in a double corner with two kings, or of defeating two kings — one in each double corner — with three kings in the middle of the board (a problem frequently given up as a "draw" by the uninitiated), the student may travel by graduated stages into "bridge" positions, "gambits," long or short "shots"; to draw with inferior forces, make "slip" moves, etc., etc. As in music, there are certain "themes" in checkers, such as throwing a piece to retard the opponent's advance or to draw him off a given line. The finest example of this type is by Hugh Byars (1889): B., 10, 11, 21; W., 18, 19; king on 22: W. to play and win — 22–17; 21–25; 17–21; 10–14; 18–9; 25–30; 21–25; 30–21; 9–6; 21–17; 6–2; 17–14; 2–7; W. wins. If white does not sacrifice the king at the 7th move, the black king would capture the piece on 19 and draw. A simpler theme, arrived at from three settings is: (a) B. 19; king 28; W. 32; king 26; W. to play and win — 32–27; 28–32; 27–24; 19–28; 26–23; W. wins. (b) B. 12, 24; king 27; W. 20; kings 11, 26; W. to play — 26–31; 27–23; 20–16; 12–19; 11–16; 24–28; 31–27; 23–32; 16–23; W. wins. (c) B. 21, 28; kings 2, 25; W. 30, 32; kings 5, 10; W. to play — 5–9; 25–22; 9–13; 22–18; 30–26; 21–25; 13–9; 25–30; 9–5; 30–23; 32–27; 23–32; 10–6; 2–9; 5–23; W. wins. A draw can often be secured with a piece down: B. kings 29, 30; W. king on either 17 or 18; by one move (to 22) white draws. Again, B. 13; king on 17; W. king on either 15 or 23; by moving to 18 and keeping control of that square and 22, white holds the two blacks in perpetual check. Three B. kings on 13, 14, 15; and two W. kings on 22 and 23, with black to play, makes a tricky win for black; now remove the "crown" from the king on 13, black to play, and white draws. The "slip" theme may be illustrated thus: B. men 5, 9, 11, 20; W. men 18, 24, 27, 32; W. to play — 27–23; 20–27; 18–15; 11–18; 23–14; 9–18; 32–14; W. wins. The "in-and-out" or "waiting jump" is a simple trick rarely practised by novices, although the possibility arises in perhaps 50 per cent of their games: B. men on 7, 16, 21, 24; W. men on 6, 25, 30; W. to play — 30–26; 21–30; 6–2; 30–23; 2–18; thus in 3 moves and with one piece down, white clears the board. Perhaps the greatest fascination of checkers is the immense variety of "shots" or "strokes" that frequently crop up in play and are only too often overlooked. On a crowded board it is possible, by a series of

forced moves, utterly to annihilate the whole forces of the opponent and compel immediate surrender. J. T. Denvir's 'Traps and Shots' (Chicago 1905) gives hundreds of brilliant examples occurring in actual play, and is the most instructive, entertaining book on the game. Many of the traps are provided with names, either after their discoverers or their home towns. Thus we have the Jaques Shot, the Steel Stroke, the Bailey Shot, the "Brooklyn," the "Chicago Trap," etc. None of these is an impossible position, and the player who has committed them to memory and can lead up to them "across board" will achieve a dashing triumph over an adversary who has neglected or not yet reached the higher altitudes.

It may surprise many to learn that checker enthusiasts — and their name is legion — even possess a tutelary deity of their own, yclept "Dama" — in Great Britain, "Dameh." It is also a testimonial to the game that its most ardent devotees are Scotsmen, doctors, lawyers and practical business men, besides a host of others — even ladies — scattered throughout the English-speaking world. Almost every town, county, State, colony or country has its clubs and its champions. The greatest master of the game was the late James Wyllie, of Scotland; next come his compatriots Andrew Anderson and Robert Martins. These modern pioneers were followed by a brilliant school of experts, the Barker brothers of Boston, the late Robert Yates of Brooklyn, J. T. Denvir of Chicago, H. Pillsbury, Henry Spayth of Buffalo, Richard and Alfred Jordan, both champions of England, as also were J. Smith, W. Gardner, A. Hynd and H. Morral. The champion problemists include Drs. Brown, Clute, Purcell, Dean, Schaefer, Lucas and Dr. Stayman of Kansas; the Hon. J. D. Danvier of Delaware; M. Priest, ex-champion of the United States; Mr. Melvin Brown (lawyer) of New York; the late W. W. Avery of New York, and the greatest living inventor of "brain-puzzlers" on the checker board, Mr. H. D. Lyman, secretary of the American Surety Company of New York. The British Isles have produced a large number of experts, Richard Atwell, Fred Allen, W. Buchanan, F. W. Drinkwater, J. Drummond, F. Dunne, D. Gourlay, J. A. Kear, R. M'Culloch, J. Robertson, W. Strickland, J. Tonar, J. Strudwick. On the literary side of American checkers special credit is due to Messrs. Denvir, P. Ketchum, Spayth, Stearns, Whitehill and Yeomans. The roll here given could be multiplied many times without approaching the aggregate of prominent checkerists, past and present.

Bibliography.— The literature of checkers is copious; books were printed on the game in Spain in 1547, 1590, 1597, 1610 and 1650; in Paris, 1668; in London, 1694; and the first in America (New York) in 1846. Several of the older works still survive in periodical new editions, among the chief being Anderson, A., 'Game of Draughts Simplified' (Philadelphia); Atwell, R., 'Scientific Draughts' (London 1905); Call, W. T., 'The Literature of Checkers' (New York 1908); Cousins, S. E., 'Draughts: 1000 Best Games' (Northampton, Eng., 1913); Drummond, J., 'Draughts' (London and New York); Dunne, F., 'Draughts Praxis: A practical guide to scientific play' (London 1912); Gould's 'Problem Book' (London); Kear and Atwell's 'Encyclopædia of Draughts' (Bristol 1902); Lee's 'Guide to the Game of Draughts' (new ed.); Lyman's 'Problem Book' (New York); Spayth, H., 'Checker Player' (Buffalo 1895 et seq.); Stearns, L. M., 'The Draughts Marvel and Twentieth Century Checker Compendium' (Manchester, N. H., 1909); Sturges, J., 'Guide to the Game of Draughts' (London 1808–1904). There are hundreds of other publications, to most of which the reader will be directed in the works shown above.

HENRI F. KLEIN,
Editorial Staff of The Americana.

CHEDDAR, chĕd'dẽr, England, a parish in Somerset County, at the foot of the Mendip Hills, 18 miles southwest of Bristol. The dairies in the neighborhood have from the 17th century been famous for the excellence of their cheese, which is made from the whole milk, and the whey skimmed off, heated and added to the curd. Pop. 1,974.

CHEDORLAOMER, kĕd-ôr-lā-ō'mẽr, a king of Elam, mentioned in the 16th chapter of Genesis. He made numerous conquests, penetrating as far west as Canaan, and ruled over its southeastern part. After remaining tributary to him for 12 years the local princes rebelled and were reduced by Chedorlaomer with the assistance of Amraphel, king of Shinar, Arioch, king of Ellasar, and Tidal, king of Goyim.

CHEDUBA, chĕ-doo'bą or chĕd'oo-bą, or **MAN-AUNG,** Burma, an island in the Bay of Bengal, about 25 miles off the coast of Aracan, forming a township of Kyauk-pyu district; area, 250 square miles. On the island is a town of the same name. Cheduba is well wooded and fertile, but unhealthy. On the northwest coast inflammable gases are discharged in some quantity. The principal product is an excellent tobacco. Rice, indigo, pepper are also produced, and petroleum is found. Pop. 24,000.

CHEECHA, chē'chă. See GECKOS.

CHEERYBLE BROTHERS, two merchants introduced in Charles Dickens' novel 'Nicholas Nickleby.' They are twin brothers of a very genial and liberal disposition and become staunch friends of the hero. It is said that the novelist reproduced in these characters two cotton-spinners of Manchester named Grant.

CHEESE AND CHEESE-MAKING. Cheese is the curd of milk, including principally the casein and fat, coagulated, cooked, drained and pressed into solid form. Nearly all cheese is made from cows' milk, and originally it was a product of the farm. Now by far the greater portion is made in factories especially fitted for the purpose. The standard factory-made American cheese is practically identical with the English cheddar cheese, and is often so called.

In the manufacture of cheese a milk rich in fat is preferred, the cheese being nearly all fat and casein. By artificial souring of the milk coagulation is produced, so that the whey or watery part may be separated from the curd. The curd is the raw material operated on; the casein is a proteid substance that may be compared to lean meat, and is coagulated by acid. It is that part of the curd that remains when

the fat, sugar and ash are extracted. The first process of manufacture is to heat the milk (preferably sweet milk) to about 84° F. It is then tested with rennet for ripeness. A graduated cup provided with a fine hole in the bottom is filled with milk and a little rennet added. Rennet, in its commercial form, is a preserved extract from the fourth stomach of a calf. Being of a peptic character it tends to coagulate the milk, and if the milk in the cup coagulates in from 17 to 20 seconds it is sufficiently ripe for treatment. Enough rennet is then added to the supply of milk to coagulate the whole in 25 or 30 minutes. The proportions vary with conditions, but about four ounces of rennet extract to 100 gallons of milk is perhaps an average quantity. When the milk is coagulated the solid portion or curd in the vat is separated from the watery portion, by allowing the latter to drain off. This waste usually becomes food for pigs. Gang knives are then brought into use to cut the curd into cubes of a third of an inch or more, the knives being set a little less than half an inch apart and passed through the curd horizontally and perpendicularly. After cutting, the curd is gently agitated to prevent settling. This allows the curd to shrink and tends to expel a portion of the whey. The stirring may be done with a curd-rake, but factories more commonly employ what is termed an automatic curd-agitator, which is attached to the vat and driven by steam power.

The mass of curd is next heated very slowly to about 92° F. This cooking process may continue several hours, lasting until the operator finds that the curd will string about a quarter to a third of an inch on a hot iron. The whey is then drawn off. The curd is next turned and piled, to rid it of the excess of moisture. When deemed sufficiently solid it is ground and salted. The grinding may be done in one of several kinds of mills, a common form having two cylinders with teeth rotating toward each other, which operation picks the curd to pieces.

After grinding, the curd — or cheese, as it may now be called — is dipped and put into hoops to give it form for pressing. Common sizes of hoops are 14½ × 10 and 13½ × 6 inches. An iron bandage or rim is placed about the hoop to give it solidity, and a cloth wrapped about it to keep the cheese together and secure cleanliness. Pressure is then applied, at first lightly, and then increased, the cheese being usually turned over during the operation. The pressure is maintained for 16 to 18 hours, after which the cheese is ready to be cured.

Curing-rooms are built both above and below ground, the latter being preferred as being easier to maintain at a cool temperature. High temperature is very deleterious to cheese, diminishing its value by melting and leaking of fat, while the texture and flavor are also impaired. A temperature below 65° F. should always be maintained in the curing-room, and 40° is better. Ventilation must be provided, and the usual arrangement is an upright draft-pipe, run high enough to catch the wind, and with a vane at the top to turn the mouth of the funnel to the wind. The process called ripening takes place in the curing-room, determining the particular flavor of the cheese. The ripening is caused by bacteria, as is proven by making cheese from sterilized milk, in which case it retains the flavor of new-made cheese for a very long period. Dairy bacteriologists are endeavoring to isolate the different species of cheese bacteria, that they may be cultured and incorporated with the milk in starting the cheese-making. In this way the maker would be certain of securing a particular flavor for his cheese, whereas now it is a matter largely of chance as to what bacteria predominate.

The method described above is that followed in practically all the factories of the United States and Canada. About 90 per cent of the cheese manufactured is of this character. The remainder is farm-made, or made in urban dairies, or else is manufactured by some other process in imitation of some foreign cheese, as the Swiss Gruyère or Emmenthal, Limburger, Neuchâtel, Brie, etc.

The constituents of milk which determine its value for cheese-making are the fat and casein. Milk may contain from 3 to 8 per cent of fat and from 2 to 5 per cent of casein, the average proportion being about a pound of fat to two-thirds of a pound of casein. Since the cheese yield increases with the fat in the milk, managers of cheese factories have encouraged the production of milk rich in fat, and perhaps this knowledge is largely responsible for the fact that in 1900, in the factories of the United States, 100 pounds of milk made almost 17 per cent more cheese than it did in 1890.

The analysis of cheese is largely a matter of securing a correct average, as a cheese varies in properties at the centre or at the circumference. A wedge is generally taken as a sample, cut from the centre to the rind, or sometimes a plug, taken at one-third the distance from the rind to the centre. The usual test of cheese is to find the proportion of fat. For this purpose the Association of Official Agricultural Chemists of the United States Department of Agriculture have adopted the following method:

For the estimation of fat in cheese about 5 grams should be carefully weighed, and transferred as completely as possible to a test bottle. From 12 to 15 c.c. of hot water are then added and the bottle shaken at intervals, keeping it warm until the cheese has become softened and converted into a creamy emulsion. This may be greatly facilitated by the addition of a few drops of strong ammonia to the contents of the bottle. After the contents of the bottle have become cold the usual amount of acid should be added and the bottle shaken until the lumps of cheese have entirely dissolved. The bottles are then placed in the machine and whirled, the test being completed in the same manner as with milk. To obtain the percentage of fat the reading should be multiplied by 18 and divided by the weight in grams of cheese taken.

Some cheese is colored by the makers, though the best requires no coloring. Saffron and arnotto are used for this purpose. Various herbs are also incorporated with the milk at the time of making the curd, to alter the appearance or flavor of the cheese. Common among these are sage leaves, marigold and parsley.

A small proportion of the cheese used in the United States is imported. From 5,000,000 to 7,000,000 pounds a year of Swiss cheese are brought in, also some from France, Germany and England. In 1910 40,817,524 pounds of cheese were imported, while the exports were but 2,846,709 pounds. The value of the imports was $7,053,570; the exports about $442,000. Such cheese is usually named from the locality whence it comes, though sometimes the name becomes distinctive of a special make, as the Roquefort, which is made from the milk of

sheep, mainly the Larzac breed; the Kachkaval (Bulgarian), a white cheese made of sheep's milk; the Parmesan (Italian), which is kept three or four years and polished with linseed oil and charcoal till it shines like ebony; the Limburger (German), characterized by its strong odor; and the Brie (French), which is also odoriferous.

Previous to 1850 practically all the cheese made in this country was a farm product. Jesse Williams started the first cheese factory in the United States in Oneida County, N. Y., in 1851; between then and 1860 factories were established in New York State at the rate of three or four a year, and from the latter date the growth of the industry in New York was rapid, as follows: 1860, 17 new factories; 1861, 18 more; 1862, 25; 1863, 111; 1864, 210; 1865, 52; 1866, 46. Since that date the growth has been a normal one.

The United States census classes butter, cheese and condensed milk factories together, and gives the total establishments in 1914 as 7,982. These concerns manufactured in 1914 products worth $370,818,729, but most of this value is milk and butter, cheese representing only about one-sixth of the industry. The factory production of cheese in 1914 was 377,506,109 pounds, in value $50,931,925, or about 13½ cents a pound. Nine-tenths of this production was full cream cheese.

Wisconsin, where the industry began in 1864, has been the leading State in cheese-making for some years, with an annual production valued at about $9,000,000; other States average: New York $6,600,000, Minnesota $4,300,000, Illinois $2,000,000. Considerably higher figures have been given by some authorities, but this is due to other products of the dairy, as condensed milk, being figured in with the cheese.

For further information regarding cheese see Decker's 'Cheese Making' (1905), the United States census reports and reports of the New York State Agricultural Experiment Station and the Wisconsin Agricultural Experiment Station; also the yearbooks and bulletins of the Department of Agriculture.

CHARLES H. COCHRANE.

CHEESE-FLY, a small, black, dipterous insect (*Piophila casei*) bred in cheese, belonging to the *Muscidæ*, the same family to which the house-fly, blow-fly, etc., belong. It has a very extensible ovipositor, which it can sink to a great depth in the cracks of cheese and lay eggs there. The maggot, well known as the cheese-hopper, is furnished with two horny claw-shaped mandibles, which it uses both for digging into the cheese and for moving itself, having no feet. Its leaps are performed by a jerk, first bringing itself into a semi-circular attitude, when it can project itself 20 to 30 times its own length. It infests not only cheese, but also smoked meats, doing much damage in packing-houses.

CHEESE-HOPPER. See CHEESE-FLY.

CHEESE-RENNET. See BEDSTRAW.

CHEETA, CHETA, CHEETAH, or **HUNTING-LEOPARD,** a large tropical cat (*Cynælurus jubata*) forming an offshoot of the *Felidæ*. Its length and slenderness of limb give it a fleetness in running short distances, such as is probably attained by no other large mammal. Its claws are short, blunt and practically non-retractile. It pursues its prey by chase rather than by stealth; and ordinarily exhibits more dog-like than cat-like qualities, among these being great docility. It can, however, stealthily come upon its prey if occasion demands. It is about the length of a leopard, but stands much higher, is rufous or tawny in color, spotted with black, except on the throat. It is commonest in the African jungles, and thence is more sparsely distributed to India. In India it is tamed and trained by the natives as a hunter. It is treated like a falcon, leashed, hooded and kept blindfolded until the game is in sight, when it is loosed and darts upon the quarry, which it drags down and holds until the huntsman comes. The ancient monuments show that this leopard was employed by the Assyrian and Egyptian sportsmen to remote antiquity; and it is known that in the 14th century the returning Crusaders introduced the cheeta into Europe where it was used for some centuries.

CHEETHAM, Samuel, English theologian: b. Hambleton 1827; d. 1908. He was educated at Christ's College, Cambridge, was fellow there in 1850 and assistant tutor 1853–58. From 1863 to 1882 he held the chair of pastoral theology at King's College and in 1879–82 was archdeacon of Southwark. From 1875 to 1880 he edited the 'Dictionary of Christian Antiquities.' He published 'A History of the Christian Church during the First Six Centuries' (1894); 'The Mysteries, Pagan and Christian' (1897); 'Mediæval Church History' (1899); 'History of the Christian Church Since the Reformation' (London 1908).

CHEEVER, Ezekiel, American school teacher: b. London, England, 25 Jan. 1614; d. Boston, Mass., 21 Aug. 1780. He received a good classical education and emigrated to America in June 1637, in order to enjoy religious freedom. With Davenport and Eaton he was one of the founders of New Haven, Conn., where he married and taught school in his own house, Michael Wigglesworth being one of his pupils. About 1650 he removed to Ipswich, Mass., where he was the first master of its Free, or Grammar, School; in 1661 he went to Charlestown in a similar capacity, and in 1670 was called to Boston as headmaster of its free school and remained there the rest of his life. His 'Latin Accidence: an Elementary Grammar of the Latin Language,' was for a century the most popular introductory Latin textbook used in New England, 18 editions having been printed before the Revolution (10th ed., 1767; 20th ed., Salem 1785). He also wrote 'Scripture Prophecies Explained, in Three Short Essays,' an edition of which was printed in Boston 1757. His funeral sermon was preached by his pupil and friend, Cotton Mather. Consult Gould, 'Ezekiel Cheever, Schoolmaster' (Boston 1905).

CHEEVER, George Barrell, American clergyman: b. Hallowell, Me., 17 April 1807; d. Englewood, N. J., 1 Oct. 1890. He was graduated at Bowdoin College in 1825 and at the Andover Theological Seminary in 1830. In 1839 he became pastor of the Allen Street Presbyterian Church in New York, and from 1846–67 was pastor of the church of the Puritans, New York. He distinguished himself as an

anti-slavery advocate in the pre-Civil War period. He was editor of the New York *Evangelist* from 1845 to 1846, and at different times connected with the New York *Observer* and *Independent*. He was an able and vigorous writer and speaker, and the author of a large number of works in prose and verse. Among his publications are 'Studies in Poetry' (1830); 'God's Hand in America' (1841); 'Poets of America' (1847); 'Windings of the River of the Water of Life' (1849); 'The Voice of Nature and Her Foster-Child, the Soul of Man' (1852); 'Lectures on the Life, Genius and Insanity of Cowper' (1856), arguing that Cowper's religious terrors proved him sane instead of insane; and 'God Against Slavery and the Freedom and Duty of the Pulpit to Rebuke It' (1857). One of his most effective works was 'Deacon Giles' Distillery.'

CHEFOO, chi-foo, or chē'foo', China, a treaty port in the province of Shantung, the most easterly of Chinese provinces. Its population includes about 400 foreigners and 80,000 Chinese; its currency is the Chefoo tael and the Mexican dollar; its exported products are vermicelli, peanuts, bean cake, bean oil, silk, silk waste, silk pongee, straw braid, thread lace and hair-nets. In 1863 the port was opened to foreign trade. Although it is not a foreign settlement it has a recognized foreign quarter which is well kept and has clean roads. The entire city, Chinese as well as foreign, is well lighted by electricity. An international committee, consisting of six foreigners and an equal number of Chinese, "looks after the interests of the foreign quarter," as the consul of the United States at Chefoo wrote on 17 June 1916; and voluntary contributions of residents enable that committee to meet necessary expenses. The trade of the district with the United States and Europe passes mainly through Shanghai, Tientsin and Japanese ports. The net value of Chefoo trade during 1915 was $22,312,696. The number of steamers entering the port in 1915 was less than in any year since 1900 — it was 1,693, of 1,434,569 tonnage; and the principal nationalities represented were British, with 527 vessels; Chinese, 588 vessels; Japanese, 494 vessels; Russian, 47 vessels; American, 26 vessels.

CHEHALIS, chē-hā'lĭs, RIVER, Washington, in the southwestern part of the State. It has its rise in Lewis County, flows north-northwest and through Chehalis County, into Gray's Harbor. Its length is 125 miles, and is navigable for light steamers some distance from the mouth.

CHEILOGNATHA, or **CHILOGNATHA,** kī-lŏg'na-tha, also known as Diplopoda, one of the two orders of *Myriapoda,* including the millipedes (q.v.) and other forms. See MYRIAPODA.

CHEILOPODA, or **CHILOPODA,** kī-lŏp'ō-da, one of the two orders of *Myriapoda,* represented by the centipedes (q.v.). See MYRIAPODA.

CHEIROMANCY, or **CHIROMANCY,** kī'rō-măn-sĭ. See PALMISTRY.

CHEIROMYS, kī-rō'mĭs, a generic name sometimes given to the Aye-aye. See AYE-AYE.

CHEIROPTERA, kī-rŏp'tĕ-rā, an order of mammals, the bats, closely related to the insectivores and characterized by the immense extension of the forelimbs so as to form wings, and by other adaptations of the skeleton for an aerial life. The order is divided into two groups: *Megacheiroptera* and *Microcheiroptera.* The former consists wholly of the great fruit-eating bats of the Old World tropics; the latter contains all the remaining families. They are separated principally by dental features. See also BATS.

CHEIROTHERIUM, kī-rō-thē'rĭ-ŭm. See LABYRINTHODONTA.

CHEKE, chēk, **Sir John,** English scholar: b. Cambridge, 16 June 1514; d. London, 13 Sept. 1557. He was educated at Saint John's College, Cambridge, and made Regius professor of Greek. In 1544 he was appointed tutor to the future Edward VI, and appears likewise to have assisted in the education of the Princess Elizabeth. On the accession of Edward he was knighted, became Secretary of State in 1553 and was also a privy-councillor. On the King's death he became Secretary of State for Lady Jane Grey, for which he was committed to the Tower by Mary. After a few months, however, he was set at liberty and settled in Strassburg; but his connection with the English Protestant Church there gave offense to the Roman Catholics in England, and his estates were confiscated. He supported himself by teaching Greek, but in 1556, having been induced to visit Brussels, he was arrested by order of Philip II and sent prisoner to England. Under threat of the stake he recanted and received the equivalent of his forfeited estates. His chief distinction was the impulse given by him to the study of Greek. His best work is his translation of the 'Gospel of Saint Matthew,' edited by Goodwin (1843).

CHEKHOFF, or **TCHEKHOV, Anton Pavlovitch,** Russian author: b. Taganrog 1860; d. 1904. Of humble parentage, he yet received a good education, studied medicine at the University of Moscow, and practised only about a year in a small cholera hospital. At the age of 19 he began writing short stories under the pen-name of "Chekhonté." The favorable reception accorded his first volume of stories encouraged him to desert medicine for literature, where his scientific training was to prove of inestimable value. His mental trend was from the first inclined to the banal aspects of Russian life. With grim satire he seized on all that was petty, mean and sordid in human character, and with Gorky, became one of the most prominent exponents of the Russian school of sordid realists. Chekhoff's writings reveal a crowded stage of humble characters — aristocrats are excluded — photographed from life, merchants, students, priests, schoolmasters, saloon-keepers, magistrates, neurotics, lunatics, officials, etc., with all their mean sordidness and narrow-minded simplicity. Where he introduces doctors — which is frequently — he revels in describing physical and mental diseases, of which latter 'The Black Monk' is the best example. An atmosphere of sadness and hopelessness pervades his characters and impresses itself upon the reader; his vivid portrayal of poverty and squalor, dishonesty and vice, frivolity, drunkenness, misery and coarseness, is certainly depressing even if true to life. Yet Chekhoff is withal a great master; brilliant, of

Fig. 1 Slender Lori 2 Foot of Slender Lori 3 Skull of Slender Lori 4 Black-fronted Lemur 5 Skull of Flying L
11 The same flying. 12 Common Bat crawling 13 Skull of Horseshoe Bat 14 Skull of Common
20 Skull of Water Shrew 21 Elephant Shrew

ing Lemur 6 Aye-Aye 7 Flying Fox 8 Skeleton of a Bat 9 Head of Vampire Bat 10 Long-eared Bat Hanging
moon Bat 15 Hedgehog 16 Skull of Hedgehog 17 Mole 18 Skull of Mole 19 Common Shrew
ew 22 Skull of Alpine Shrew 23 Canadian Mole

penetrating psychology, with a remarkable flow of language, and a weird faculty of suddenly turning a humorous situation into a painful tragedy. His attempts at dramatic writing are less successful, being, at first, feeble dramatizations of some of his stories. One of his best plays is described elsewhere (see CHERRY ORCHARD); others are 'Ivanoff'; 'The Seagull'; 'Uncle Vanya, or Country Life'; 'A Marriage of Calculation'; and 'The Three Sisters.' Most of his works are translated into French and German, some into English. Among his numerous stories are 'The Sorceress,' 'Agatha,' 'The Enemies,' 'The Nightmare,' 'The Twilight,' 'The Steppe,' 'A Melancholy Tale,' 'A Stranger's Story,' 'Room No. 6,' 'The Gabled House,' 'The Kiss,' 'Philosophy at Home,' 'Sorrow,' 'The Biter Bit,' 'In Exile,' 'Sleepy-Eye,' 'Street Scene in Russia,' 'From a Doctor's Practice.' He left 10 volumes of works.

CHEL-AB-KU-KIL, or **AB-KU-KIL-CHEL,** an Indian priest of Yucatan who flourished in the 15th century. His name is mentioned in almost every Yucatanic legend, and fragments of history composed by him are found in documents of the missions of Yucatan and Central America.

CHELAN, chē'lăn, **LAKE,** Washington, in the mountains of Okanogan County, 70 miles long, about 3 miles wide and the largest lake in the Northwest. Its chief inlet is Stehekin or Pierce River, on which, about three miles distant from the lakes, are the famous Rainbow Falls, 300 feet high. The outlet is Columbia River. Chelean, Moore, Stehekin and Johns, towns on its banks, are summer resorts.

CHELARD, shĕ-lär, **Hippolyte André Jean Baptiste,** French musician and composer: b. Paris, 1 Feb. 1789; d. Weimar, Germany, 12 Feb. 1861. After studying in the various musical centres of Europe, he brought out his first comic opera, 'Casa da Vendere,' in Naples in 1815. In 1816 he settled in Paris as a teacher of music and violinist. In 1827 his lyrical opera, 'Macbeth' (with words by Rouget de Lisle), was very successful and procured for him the place of chapel master to the king of Bavaria. He went to London in 1832, where he conducted German opera. In 1836 he was made chapel master to the Grand Duke of Weimar. He produced other operas and cantatas, the most successful of the former being 'Der Student' (1831); 'Mitternacht' (1831); 'Die Hermannsschlacht' (1835).

CHELLÉEN, chĕ-lā-ăn, this name is given by French archæologists to certain leaf-shaped flint implements found near Chelles in the department of Seine-et-Marne, and supposed to be the oldest relics of prehistoric man in Europe. The name is also given to the epoch, early Pleistocene, in which the makers, who were on the Neanderthal, lived. The climate then was warmer and moister than now, so much so that the hippopotamus and rhinoceros inhabited Europe. It is impossible to say what was the equivalent of the Chelléen Epoch in the United States, though, perhaps, it was equivalent to one of the earlier retreats of the continetal ice sheet in the glacial period, if not altogether pre-glacial. See GLACIAL PERIOD; ANTHROPOLOGY; PLEISTOCENE.

CHELLES, shĕl, **Jean de,** French architect and sculptor of the 13th century. He is best known for his work on the southern portal of Notre Dame in Paris. This beautiful entrance remains as it was constructed in 1257.

CHELMINSKI, chĕl-min'skē, **Jan,** Polish painter: b. Brzostov, Russian Poland, 1851. He studied in Warsaw under Kossaks and under Wagner, Brandt and Franz Adam at the Academy, Munich. In 1884–87 he was in the United States and resided afterward in London and Paris. In his early career he portrayed mostly hunting and military subjects, and attained a great success. The principal works of this period are 'Stag Hunt in the Time of Louis XV' (1876); 'Morning in the Ukraine'; 'Empress of Russia on a Fox Hunt.' His principal later works are a series of battle pictures portraying the deeds of the Polish legion in the Napoleonic wars. Other recent canvases are 'Outskirts of Soissons 1814' (1907); 'Pursuit of a Courier, 1812' (1910).

CHELMSFORD, chĕmz'fĕrd, **Frederic Augustus Thesiger,** 2D BARON, English general: b. 31 May 1827; d. London, 9 April 1905. Entering the army in 1844, he served in the Crimea and through the Indian mutiny. As deputy adjutant-general he served in the Abyssinian campaign, was made aide-de-camp to Her Majesty, and adjutant-general to the forces in India (1868–76), and in 1877 was appointed commander of the forces and lieutenant-governor of Cape Colony. He restored Kaffraria to tranquillity, and was given the chief command in the Zulu war of 1879. After great difficulties with the transport, and some disasters, such as those of Isandhlwana and Intombi, he gained the decisive victory of Ulundi on 4 July, before the arrival of Sir Garnet Wolseley, who had been sent to supersede him. On his return to England he became lieutenant of the Tower, a post which he held till 1889. He was appointed lieutenant-general in 1882, in 1888 general and in 1893 was retired.

CHELMSFORD, Frederic John Napier Thesiger, 3D BARON: b. 12 Aug. 1868. He was educated at Winchester College, graduated at Magdalen College, Oxford, 1892, and was a fellow of All Souls' College, Oxford, 1892–99. He has served on the London school board and the London county council; was governor of Queensland, 1905–09, governor of New South Wales, 1909–13, and in 1916 was appointed viceroy of India.

CHELMSFORD, England, a municipal borough and capital of the county of Essex, 30 miles northeast of London by rail, situated near the confluence of the Chelmer and Cann. There is a good municipal water supply and the streets are lighted by electricity. The church of Saint Mary is a fine old building of the 14th or 15th century. Among the public buildings are the corn-exchange and the shire-hall containing the Court of Assize. There are manufactories of agricultural implements, electrical apparatus and motor cars, and a considerable trade in corn and malt is carried on. On the banks of the Chelmer are several large flour-mills. The town gives name to a parliamentary division of the county. The Romans had a station on the site of Chelmsford and Roman remains have been found in the neighborhood. Pop. 18,008.

CHELMSFORD, Mass., town in Middlesex County, five miles southwest of Lowell, on the Boston and Maine and the New York, New Haven and Hartford railroads and on the Merrimac River. The town contains several old residences of historic interest, the Adams Library and Silver Lake. The Middlesex County Training School is situated here. The town has large agricultural interests and manufactures woolens, worsteds, hardware, and has cotton-scouring establishments. The government is vested in a board of three selectmen. Pop. 5,010.

CHELONIA, kę-lō'nĭą, or **TESTUDINATA,** tes-dū-dĭ-nā'tą, an order or sub-class of *Reptilia* (q.v.) containing the turtles and tortoises, and one of the most sharply defined groups of vertebrates. The body is enclosed in a more or less well-developed bony box, from which the head, neck, tail and two pairs of limbs protrude, and into which they may be completely retracted in some tortoises and terrapins. This box is a unique feature among reptiles and is divided into a dorsal shield or carapace composed of numerous dermal bones usually arranged regularly and supported on the ribs and vertebral spines, and a ventral shield or plastron likewise composed of dermal bones, among which are incorporated the clavicles and interclavicle. Both carapace and plastron are usually encased in horny plates, which do not correspond to the bony pieces. Except for the head, neck and tail, which are flexible, the vertebræ are immovably ankylosed with the carapace. The skull is very compact, with a small brain cavity, and exhibits many structural peculiarities, of which two of the most apparent are the complete fixation of the quadrate bone and the substitution of horny cutting plates for teeth on the margins of the jaws. Both shoulder and pelvic girdles are permanently enclosed within the shell, and the latter may be firmly united to both carapace and plastron. The limbs may be flattened paddles in the sea turtles, or true walking legs with free toes in the other groups. All chelonians have well-developed lungs; but some aquatic forms have additional respiratory organs in the form of vascular areas and papillæ in the pharynx and œsophagus, or respiratory sacs in connection with the rectum. Pulmonary respiration is maintained partly by the movements of the neck and limbs in and out of the shell and partly by the hyoid apparatus. Without any known exceptions, chelonians are oviparous, and, after burying the eggs in the earth, allow them to be hatched by the warmth of the sun. Except in the colder regions turtles are found throughout the world, and are mostly inhabitants of fresh water, though a considerable number are terrestrial and a few marine. Between 200 and 300 living, and a great many extinct, species are known, many of the latter belonging to families not represented in the recent fauna. The chelonia are divided into four sub-orders:

1. *Athecæ,* in which the carapace is of leathery consistency and is supported by numerous small, irregular, separate bones free from the ribs. There is one family (*Dermatochelydidæ*), containing the leather-turtle (q.v.).

2. *Trionychoidea,* with a true carapace composed of dermal bones united to the ribs, but covered by a leathery skin, and lacking the marginal bones; the pelvis is free from the plastron. There is one family (*Trionychidæ*), the soft-shelled turtles. See TURTLES.

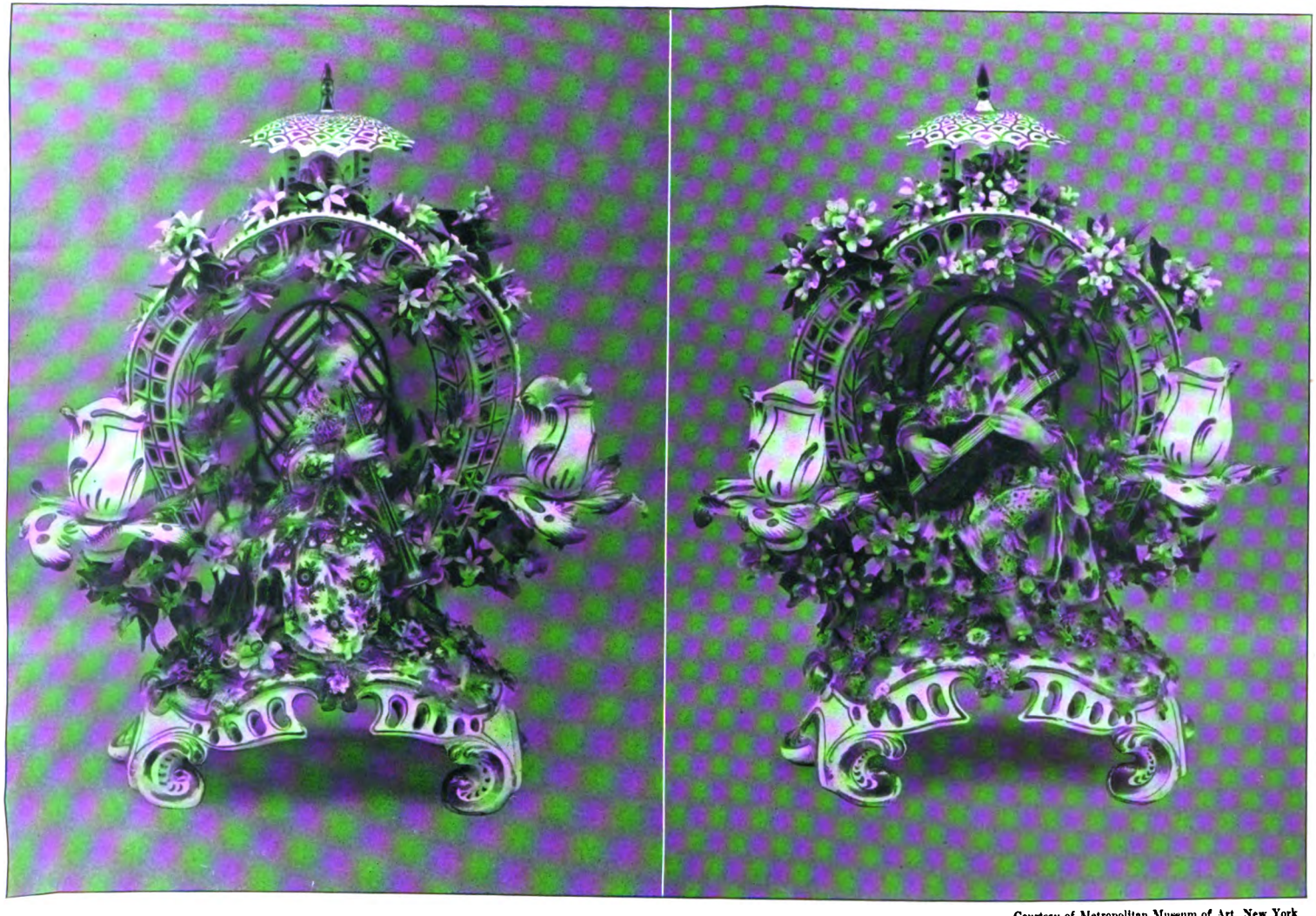
3. *Cryptodira,* in which the carapace is covered with horny plates and provided with marginal bones, and the pelvis is free from the plastron. It embraces the following families: *Chelonidæ,* including marine turtles, as the green, loggerhead and tortoise-shell turtles; *Testudinidæ,* land-tortoises and gopher tortoise; *Chelydridæ,* snapping-turtles and alligator-turtles; *Cinosternidæ,* terrapins and mud-turtles; and several others confined to the tropics of both hemispheres.

4. *Pleurodira,* in which the carapace is similar to that of the *Cryptodira,* but the pelvis is ankylosed to the plastron, and the neck folds in a horizontal instead of a vertical plane. They are all inhabitants of fresh waters in the tropical parts of both the Old and New Worlds. Representative families are the *Pelomedusidæ,* tartaruga (q.v.) and *Chelydidæ,* matamata (q.v.).

Consult Gadow, 'Amphibia and Reptiles' ('Cambridge Natural History,' London 1901), and Baur, in a bulletin of the United States National Museum.

CHELSEA, chĕl'sē, England, a metropolitan and parliamentary borough in Middlesex and western suburb of London (area, 659 acres), on the north side of the Thames, chiefly distinguished for containing a royal military hospital. A building was originally commenced here by James I as a theological college, but was never finished. In the reign of Charles II the erection of the present hospital for sick, maimed and superannuated soldiers was begun. It was carried on during the reign of King James II and finished in that of William and Mary by Sir Christopher Wren, in 1692. The whole expense of this structure amounted to £150,000, and the extent of the grounds is now about 66 acres. The pensioners maintained here number about 550, and consist of soldiers maimed or disabled in the military service or who have served for 21 years. All pensions are granted by the commissioners of Chelsea Hospital, but most of the recipients are known as out-pensioners. Their number amounts to about 85,000. It is from them that the in-pensioners are selected. The Duke of York's school for the children of soldiers, formerly situated near the hospital, has been removed to Dover. There are great military barracks, but these are not within the boundaries of the borough. Chelsea is replete with literary associations — Swift, Steele, Smollett, Turner the painter, Leigh Hunt, Rossetti, Whistler and Carlyle all having resided here. Carlyle is known as "the Sage of Chelsea." The borough returns one member to Parliament. Pop. (1911) 66,385. Consult Beaver, 'Memorials of Old Chelsea' (1892); Blunt, 'A Historical Handbook to Chelsea' (1900); Davies, 'Chelsea Old Church' (1904); L'Estrange, 'The Village of Palaces: Chronicles of Chelsea' (1880); Martin, 'Old Chelsea' (1889).

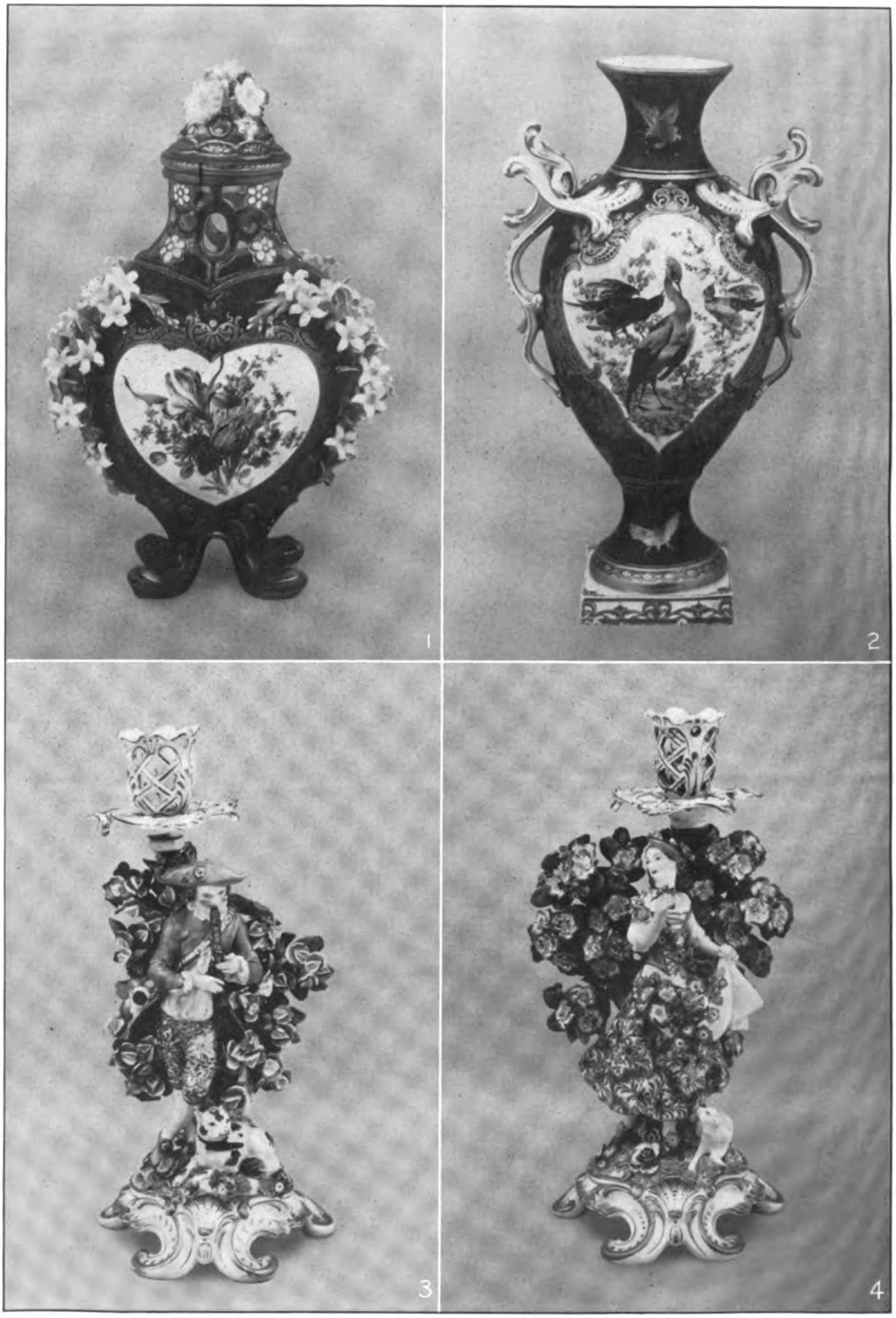
CHELSEA, Mass., city of Suffolk County, separated from East Boston by Chelsea Creek, and from Charlestown by the Mystic River. It is a suburb of Boston, and is connected with it by ferries, electric and steam railroads; and the Mystic River is crossed here by a bridge 3,000



Courtesy of Metropolitan Museum of Art, New York

Pair of Candlesticks. "Chinese Taste" Style (late 18th Century)

CHELSEA PORCELAIN



Courtesy of Metropolitan Museum of Art, New York

1 Vase with Heart Medallion decoration. Open-work Neck (between 1757 and 1770)
2 Vase with "Exotic" Bird Motif, Rococo Handles (late 18th Century)
3 and 4 Pair of Candlesticks. "Rustic" Figures on Rococo Scroll Bases (late 18th Century)

feet long. Chelsea has a United States Marine Hospital, United States naval powder magazine, Soldiers' Home, Fitz Public Library and Odd Fellows' and Masonic halls. It has extensive manufactories of rubber goods, foundry and machine-shop products, leather, cordage, brass goods, pottery, iron and steel, etc. In 1909 there were 110 manufacturing establishments, with $11,021,000 capital and 5,954 hands and an annual output valued at $17,002,000. It has numerous churches, high and graded public schools, weekly newspapers and two national banks. Chelsea was settled at Winnisimmet in 1630; was a part of Boston until it was organized as a town in 1738, and was incorporated as a city in 1857. In 1914 a destructive fire swept over the manufacturing section of the city, causing a loss of over $17,000,000. The burned-out section, however, has been almost entirely rebuilt. Pop. (1910) 32,452.

CHELSEA HOSPITAL. See CHELSEA.

CHELSEA VILLAGE, now a part of New York. The name is still preserved in Chelsea square between Ninth and Tenth avenues and Twentieth and Seventy-first streets. Clement C. Moore, the author of 'Twas the Night Before Christmas,' owned here a farm in the early part of the last century. He sold it off in lots, and the place was called Chelsea Village.

CHELSEA WARE (soft porcelain). There is doubt as to the date when the Chelsea (London) factory was started. Both 1730 and 1744 are claimed. The earliest dated Chelsea pieces (two extant "goat and bee" decoration milk jugs) have incised triangle and "Chelsea, 1745" as marks. They are of such expert workmanship as to create a supposition that the factory had been already operating for some years. Chelsea ware appears to have had a high reputation and large sale in France as early as 1745. Charles Gouyn was manager of the factory in 1747. In 1750 Nicholas Sprimont held that post, to become proprietor by 1759. The Duke of Cumberland and Sir Edward Fawkener financed the works to their loss, but Sprimont became wealthy. Sprimont sold the factory to Charles Cox in 1769. The latter sold out the next year to William Duesbury, owner of the Derby porcelain factory. Duesbury ran the works till 1784, then transferred the entire plant to Derby. See DERBY.

Characteristics.— Early pieces (to 1749) were thick and badly potted, the frit (artificial) paste being difficult to manipulate. Numerous pieces were white; no gilding was in use then. Decoration simple, with tendency to Meissen (Dresden), Sèvres and Chinese styles. Forms were often after silversmiths' ware. From 1750 to 1753 we find Japanese patterns. Chelsea figures are said to show better finish than Bow ware and to be rather thinner in the face than Derby figures. The "spur" marks, bare of glaze, are a characteristic of this ware. The rococo scroll more often decorates the foot of the Derby and Chelsea figures, whereas the scroll itself forms the foot of Bow figures. In general there is so much likeness in Bow, Chelsea and Derby ware as to cause much discussion as to provenance of pieces. Differences in paste and glaze are the points connoisseurs depend on largely.

Product.— Rococo vases, figures of Chinese, harlequins, animals, Cupids, groups, dinner, tea, coffee and dessert services, épergnes, beakers, candlesticks, cups with stands, small seals representing animals, hafts for table and dessert knives and forks, scent bottles, caudle cups, etc. Figures vary from one inch to over two feet. Finest pieces are said to have been produced in Chelsea's last period.

Decoration.— Plain white and simple decoration came first, with Oriental and Continental, especially Dresden patterns. Underglaze blue (cobalt) and enamel overglaze colors followed. Sprimont colors were very brillant compared with the Derby ware. Chelsea figures are very fine (some have the noted "bocage" raised flower and foliage decoration) and came from the hands of such sculptors as Nollekins Senior, Roubilliac and Bacon. Kändler's and Acier's Meissen (see DRESDEN) figures were frequently closely copied. Beautiful decoration also was done by such painters as Zachariah Bowman, Sir Thomas Thornhill, Willinson ("exotic" birds), and by John Hall, later noted as engraver. Other artists were Boyer, Askew, Barton, Gauron, Dyer and Mills. Chelsea's beautiful ground colors consist of the unique "Chelsea claret," "mazarine" blue, pea-green, turquoise, termed "celeste," etc. Her elaborate gilding is sometimes chased or even raised.

Glaze.— The large proportion of lead caused great brilliancy; it made the underglaze blue spread with its soft absorbent qualities, so as to form a lovely blue tinge over the entire surface. This plumbiferous glaze had a softness and richness that experts termed "luscious," "sensuous," etc.; its softness often causes the surface to show wear. Late pieces often show cracks from defective firing.

Paste.— First paste was soft and of uneven density, rendering it opaque in the denser portions and translucent in the remainder of the body. This created the appearance of the so-called "grease spots" or "moons" when held up to light. Later (1757–69) the body becomes whiter and more evenly translucent (a phosphatic paste).

Marks.— First "Chelsea, 1745" and incised triangle. Then anchor impressed in relief on oval medallion or painted (red), sometimes in gold. W. M. Binns says the gold belongs to last period. Next came two anchors (last reversed) touching, in red used to about 1758, then red or gilt till 1768. Oriental style pieces often have "Chinese seal" mark. The mark of trident and crown is on some pieces.

Chelsea-Derby Period (1770–84).— Duesbury substituted Derby features (see DERBY) in body, glaze, style (severely classic) and decoration. The wonderful Chelsea "claret" color disappeared. Gold stripes were favored. Products were services, vases, etc., as before. Decoration ran to festoons and other floral motifs, figures, landscapes, biscuit flowers, medallions, masks, etc. The mark is an anchor with the script "D."

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CLEMENT W. COUMBE.

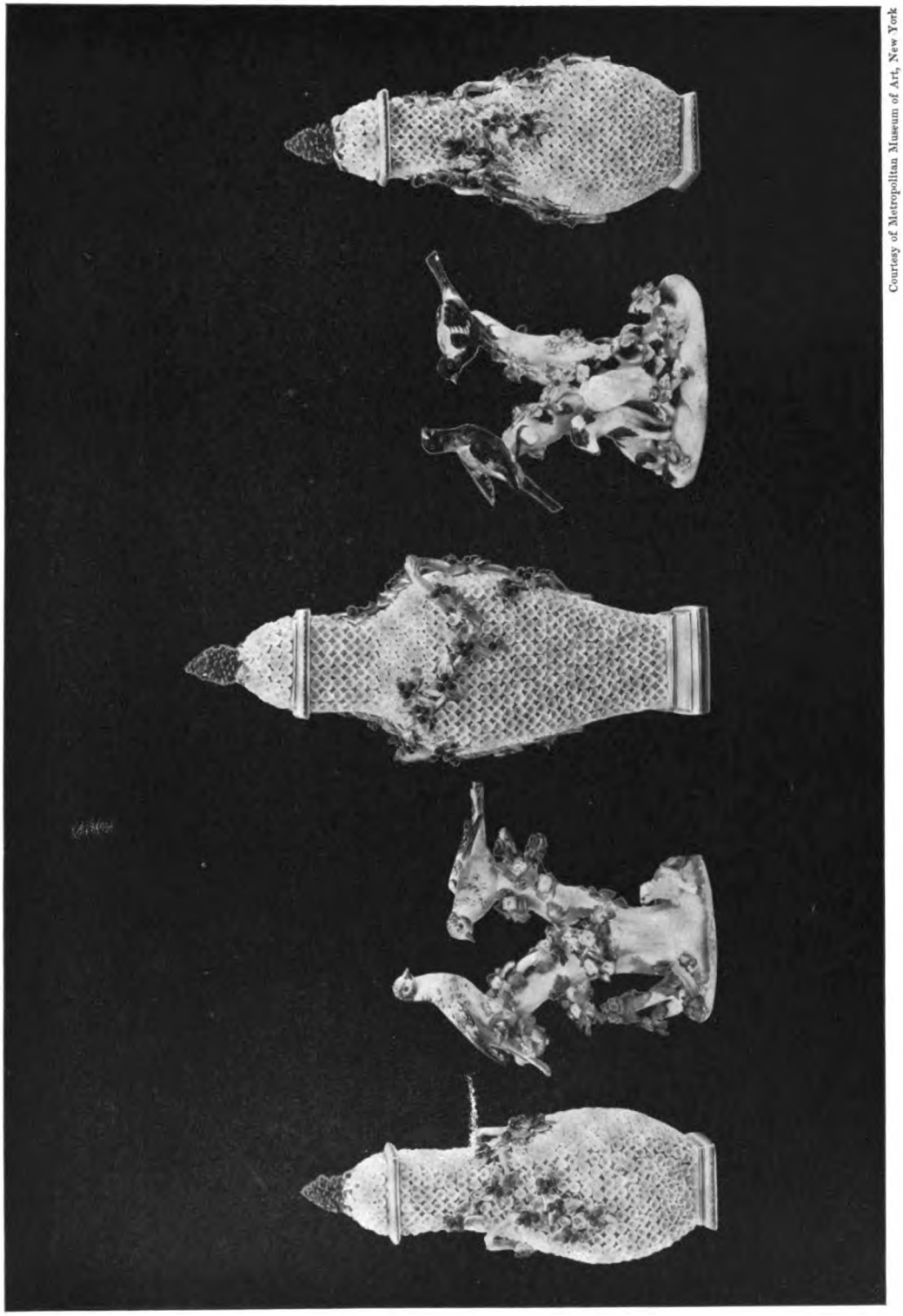
CHELTENHAM, chĕl'tĕn-ăm, England, a municipal and parliamentary borough and popular watering-place in the county of Gloucester, seven miles northeast of the city of Gloucester, on the river Chelt, a short tributary of the Severn, 120 miles from London by rail. It is a city of gardens, protected by hills and surrounded by beautiful scenery. Cheltenham spas first occasioned the rapid growth of the town, but the baths and springs are less frequented than formerly. The springs were discovered in 1716 by accident, but became famous in 1788 through a visit paid to them by George III. The parish church is a fine old Gothic structure, and the Roman Catholic and Congregational churches are two of the finest in England. The town is also noted as an educational centre. There is a college for boys (founded in 1843), with an attendance of 700 scholars; and the ladies' college, with 500 pupils. There are also two training colleges for teachers. Among other public institutions may be mentioned its libraries, assembly-rooms, the college museum, pumprooms and numerous places of fashionable resort. There are hospitals, orphanages, etc. Cheltenham returns one member to Parliament. The town has a large brewery and ironworks. Pop. 48,942.

CHELYUSKIN, chĕl-yoos'kĭn, **Cape** (formerly Northeast Cape, and sometimes called Cape Severo), the extreme northern point of Asia, on a peninsula of the same name, which forms the western arm of the eastern half of the Taimyr Peninsula. It is named after a Russian officer who led an expedition thus far in 1742, and here succumbed, with his wife, to the fatigues of the journey; it was not revisited till 1878, when Nordenskjöld, in the *Vega,* spent 19 and 20 August here. Lat. of the west is 77° 36′ 37″ N., that of the east 77° 41′ N.

CHEMICAL AFFINITY, the force or tendency which causes two or more dissimilar substances to combine in definite proportions to form a new substance, whose properties are distinct from those of any of the constituents. The word "affinity" was originally employed in this sense because it was believed that a kind of relationship exists between substances that are capable of combining with one another. No such idea as this is entertained in modern times, and it might even be said that the tendency toward combination is (in general) stronger, in proportion to the dissimilarity, or lack of obvious relationship, between the substances combining. In the time of Aristotle the constituent particles of bodies were conceived to be endowed with qualities somewhat akin to love and hate. After the advent of Galileo, these notions were exchanged for equally erroneous but more mechanical ones, and the ultimate particles were represented, in thought, as provided with hooks and other similar devices, by means of which their combinations were conceived to be effected. Later, when the law of universal gravitation was propounded by Newton, the force impelling the atoms toward one another, and holding them in their combinations, was naturally enough pictured as a special form, or manifestation, of gravitative action. This latter view may possibly be true, but if so we must modify our present views with regard to gravitation somewhat, and assume that it follows different laws, when acting at molecular distances, from what it does when acting at distances that are appreciable to the senses. The modern tendency appears to be rather in favor of viewing chemical affinity as an electrical manifestation, though this conception has not yet been developed in a wholly definite and satisfying form. (See ELECTRON).

It was formerly thought possible to arrange the elements in the order of their chemical affinity, so that each element in the array would expel all those that preceded it from their combinations, and tables of this sort were published two centuries ago (in 1718) by Geoffroy. Later, it was found that no such definite law exists; and Claude Louis Berthollet, in his famous 'Essai de Statique Chimique' (Paris 1803), pointed out that the combination of substances depends not only upon the affinity that such substances have for each other, but also upon the relative quantities in which they are present. For example, if barium sulphate and potassium carbonate are melted together, the former is always partially converted into carbonate; but in order to effect its total conversion into carbonate, it is necessary that the quantity of carbonate of potassium present shall be at least six or seven times as great as the equation $BaSO_4 + K_2CO_3 = BaCO_3 + K_2SO_4$ would appear to require. In recent times the necessity of taking account of the relative masses of the combining substances has been fully recognized, and a good idea of the important results that have followed may be had from Nernst's 'Theoretical Chemistry from the Standpoint of Avogadro's Rule and Thermodynamics' (translated into English by Prof. C. S. Palmer). Numerical estimates of the "affinity" of various substances have been obtained by many methods, but the results are not always in as good accord with one another as could be wished, and a discussion of the differences would require a volume. For a brief but excellent review of the different methods consult W. C. D. Whetham, 'Solution and Electrolysis.' See DISSOCIATION; ELECTRON; EQUILIBRIUM (*Chemical*); and SOLUTIONS.

CHEMICAL ANALYSIS is the art of determining the constituents of which a given substance is composed. The analysis is "qualitative" if it is made solely for the purpose of discovering what those constituents are. It is "quantitative" if the object is to ascertain the quantity of each that is present. It is hardly necessary to say that in the examination of an unknown substance a qualitative analysis must be made before a quantitative examination is attempted, because the methods that must be employed in quantitative work depend altogether upon the nature of the constituents that are to be determined. An analysis is said to



Courtesy of Metropolitan Museum of Art, New York

A Garniture of Vases and Ornaments. Dresden Style (late 18th Century)

be "ultimate" when its object is merely to discover what elements are present, and in what quantity each occurs. It is said to be "proximate" when it is made for the purpose of learning how these elements are combined with each other, and what radical or other proximate constituents are present. General methods are known, which suffice for the ultimate analysis of any compound that may be proposed; but chemical science has not yet been developed sufficiently to formulate equally general methods for proximate analyses. Methods are indeed known for the recognition of certain of the organic radicals, but most of the problems that arise in proximate analyses are of such a nature that special means must be devised to fit each special case.

Qualitative Analysis of Inorganic Substances.

In the qualitative analysis of inorganic substances, the color that a given compound communicates to the flame of a Bunsen burner often affords useful information as to the nature of the compound, and a systematic examination of the substance in the flame of the blowpipe may afford much additional information. (See Blowpipe Analysis). When the substance is partially volatilized in the flame of the Bunsen burner, or by the electric spark from an induction coil, and the light of the flame (or the spark) is examined through the spectroscope, many of the elements can be recognized, even when present in exceedingly small quantities, by the occurrence, in the spectrum, of certain characteristic bright lines, or groups of such lines. (See Spectroscopy). The usual method employed, however, for the detection of the commoner bases and acids, is known as the "wet process," and consists in bringing the substance into solution, and noting the behavior of this solution when certain reagents are added to it. Even in the analysis of inorganic substances (which are alone considered in the present section) troublesome combinations sometimes occur, and in such cases the reaction that might naturally be expected at a certain stage in the examination may be modified to a considerable extent, or even be suppressed altogether. An adequate account of conditions of this sort cannot be given in the present article, and they are not stated with any degree of completeness in the more elementary manuals on inorganic analysis. Good accounts of the various difficulties of this sort will be found, however, in Douglas and Prescott's 'Qualitative Chemical Analysis,' to which the reader is referred. The existence of difficulties and limitations being recognized, a general scheme for the detection of the commoner metallic elements may be given, which will be found to work satisfactorily in the majority of cases.

The first step in making an analysis in the wet way is to ensure the absence of organic matter, which might seriously interfere with the subsequent reactions. If organic matter be present, it may usually be detected by heating a part of the compound in a closed tube. If it blackens, or gives off a characteristic empyreumatic odor, organic matter is probably present, and it must be destroyed either by the continued application of heat, or (if there appears to be danger of losing any essential part of the inorganic substance by volatilization) by warming it with strong sulphuric acid. The organic matter being destroyed by either of these methods, the next step is to bring the substances into a state of solution. Water, either cold or hot, should first be tried as a solvent. If this does not suffice, hydrochloric acid, nitric acid or alkaline solvents may be tried. If these reagents fail to effect solution, one part by weight of the substance may be mixed with five parts of sodium carbonate and five of potassium carbonate, and the whole heated in a porcelain crucible until quiet fusion is attained. (This may take 30 minutes). The crucible and its contents are then allowed to cool, and are immersed in dilute hydrochloric acid, or (if silver is suspected to be present) in dilute nitric acid. In this way most of the commoner insoluble substances may be brought into a state of solution. For methods that are applicable to substances that resist this mode of treatment, the more advanced treatises on analysis must be consulted. In case a part of the substances to be analyzed dissolves in water or in one of the other solvents, a separate examination of the solution so obtained should be made, the insoluble part being reserved for subsequent treatment, by the method indicated above.

The commoner metals (which are the only ones that can be considered in the present article) may be divided into seven general groups, according to their behavior when treated with certain reagents that are known as "group reagents." These classes or groups are as follows:

1. Metals forming chlorides that are insoluble in water, and which are precipitated as chlorides upon adding hydrochloric acid to their solutions. (Silver, lead and mercurous mercury).

2. Metals that are precipitated from their acid solutions, by sulphuretted hydrogen, in the form of sulphides that are insoluble in ammonium sulphide, $(NH_4)_2S$. (Mercury, lead, bismuth, cadmium, copper and silver).

3. Metals that are precipitated from their acid solutions, by sulphuretted hydrogen, in the form of sulphides that are soluble in ammonium sulphide. (Arsenic, antimony and tin).

4. Metals whose sulphides are insoluble in water, and which are precipitated from neutral solutions, by ammonium sulphide, either as sulphides or as hydrates. (Iron, manganese, cobalt, nickel and zinc are precipitated as sulphides; aluminum and chromium as hydrates).

5. Metals which, upon addition of ammonium carbonate, are thrown down in the form of carbonates that are insoluble in ammonium chloride, (Barium, strontium and calcium).

6. Metals which, upon addition of ammonium carbonate, are thrown down in the form of carbonates that are soluble in ammonium chloride. (This group contains the single metal magnesium).

7. Metals which remain in solution when treated by any or all of the foregoing reagents, and all of whose important compounds are soluble. (Potassium, sodium, lithium and ammonium).

The separation of the groups that are defined above may be effected as follows: Hydrochloric acid is added to the solution under examination, drop by drop, until no further precipitation takes place. The white precipitate which may occur at this stage consists

of the chlorides of the metals of Group 1, and is to be preserved for further examination. The solution is filtered, and a drop or two of hydrochloric acid is added to the clear filtrate, to make sure that this reagent is incapable of inducing further precipitation. Sulphuretted hydrogen gas is then passed through the filtrate until the liquid smells strongly of the gas. If a precipitate is formed, it will consist of the sulphides of the metals of the second and third groups. Silver, however, will not (in general) be present, because it is ordinarily completely precipitated in the first group, and has therefore been already removed by filtration. Lead may not be completely precipitated in the first group, and hence its sulphide may occur in the present precipitate. The mercury in the present precipitate represents mercuric mercury in the original solution The mixed sulphides of Groups 2 and 3 are removed by filtration and are washed until the wash water is no longer acid. They are then boiled with ammonium sulphide. This reagent leaves the sulphides of Group 2 undissolved, but dissolves those of Group 3. Filtration then leaves the sulphides of Group 2 on the filter paper; and when the filtrate is acidified by the addition of hydrochloric acid, the sulphides of Group 3 are thrown down again.

The clear filtrate from which Groups 2 and 3 were removed by sulphuretted hydrogen gas is next made slightly alkaline by the addition of ammonia and heated almost to boiling. Ammonium sulphide is then added, and the whole is kept warm for some time. The sulphides (or hydrates) of Group 4 are thus precipitated, and may be isolated by filtration. The filtrate from this operation is next boiled to expel all the sulphuretted hydrogen and ammonia and ammonium chloride are added. The solution is then heated to the boiling point and treated with a solution of ammonium carbonate $(NH_4)_2CO_3$. This causes the precipitation of the carbonates of Group 5, which are removed by filtration. The filtrate is boiled, and then treated with a solution of sodium phosphate, Na_2HPO_4, to which one-sixth of its volume of ammonia has been added. Magnesium, the metal of the sixth group, is thrown down (if present) in the form of a white crystalline precipitate having the formula $Mg_2(NH_4)_2P_2O_7$. This is again removed by filtration, and the filtrate will contain, in solution, the metals of Group 7.

The several groups being thus separated, it remains to examine each group by itself, to see how its components may be isolated or otherwise recognized.

Group 1. The chlorides of this group, as obtained in pursuing the general scheme outlined above, may be separated very readily. Thus if the precipitate of mixed chlorides be treated with boiling water, the chlorides of silver and mercury will be unaffected; but the chloride of lead will dissolve, and may therefore be isolated by filtration. The mixed chlorides of silver and mercury may be separated by treatment with hot ammonia. This reagent dissolves silver chloride, which is again precipitated in the form of chloride upon neutralizing its solution with nitric acid. The hot ammonia does not dissolve mercurous chloride but transforms it into a black substance that contains mercury, chlorine, nitrogen and hydrogen, and remains behind upon the filter paper.

Group 2. All the silver present being assumed to be removed in the first group, the mixed sulphides of Group 2 are washed until the wash water ceases to redden blue litmus paper, and are then boiled with a small quantity of nitric acid. Lead, bismuth, calmium and copper pass into solution in the form of nitrates, while mercury sulphide remains unchanged, and may be isolated by filtration. The filtrate, containing the mixed nitrates, is evaporated to a small volume, and sulphuric acid is added. This precipitates lead sulphate, which appears as a whitish precipitate, removable by filtration. The filtrate from this last operation may contain the nitrates of bismuth, cadmium and copper. If it is made alkaline by the addition of ammonia water, any bismuth that it contains will be thrown down in the form of the hydrate. The cadmium and copper nitrates are simultaneously reduced to the form of hydrates, which, however, remain in solution. Upon passing sulphuretted hydrogen through the solution containing them, a precipitate consisting of cadmium sulphide and copper sulphide is thrown down. If this is boiled with dilute sulphuric acid the copper sulphide remains unaffected, while the cadmium sulphide passes into solution. From the solution, sulphide of cadmium may be again thrown down by adding ammonia till the reaction is alkaline, and then passing sulphuretted hydrogen through the solution. If cadmium is present, its sulphide is thrown down as a bright yellow precipitate.

Group 3. When the sulphides of Group 3 have been isolated, some information may be had at once from the color of the precipitate. Thus arsenic sulphide is yellow, antimony sulphide is red and tin sulphide is black. If only one of these elements is present, it may therefore be detected by the color of its sulphide. If more than one are present, the mixed sulphides are treated with a solution of ammonium carbonate $(NH_4)_2CO_3$. The sulphides of antimony and tin are unaffected, but the sulphide of arsenic passes into solution, and after filtration it may be again thrown down by the addition of hydrochloric acid. The mixed sulphides of antimony and tin are transferred to a porcelain dish, and heated with a small quantity of hydrochloric acid, to which a few crystals of chlorate of potash have been added. By this treatment they are reduced to the form of chlorides. The solution containing the mixed chlorides of antimony and tin should then be somewhat diluted, and a piece of platinum foil wrapped in zinc should be added. By the electrolytic action so set up, antimony and tin are thrown down, in the metallic state, upon the platinum foil; and the foil will be blackened in spots, if antimony be present. In any case the foil should be washed and boiled with hydrochloric acid diluted with its own bulk of water. In this way any tin that may be present is brought into the form of the chloride, which dissolves; the antimony remaining unaffected. The presence of tin chloride in solution may be readily demonstrated by the addition of a solution of corrosive sublimate. The tin is thereby reduced to the form of a higher chloride, and a precipitate of Hg_2Cl_2 (calomel) is thrown down. If no tin is present, this precipitate is not formed.

Group 4. The metals of Group 4 are obtained, in the general scheme of separation out-

lined above, in the form of sulphides and hydrates. The precipitate containing them is to be treated in a porcelain dish with cold dilute nitro-hydrochloric acid. The sulphides of nickel and cobalt remain unaffected, and may be removed by filtration, since the other metals pass into solution. The precipitate that is undissolved should be tested in a borax bead before the blowpipe. (See BLOWPIPE ANALYSIS). Cobalt gives a blue bead, while nickel gives a reddish-brown one. If both metals are present, the color is intermediate between these two. In the reducing flame the reddish-brown color due to nickel changes to a gray, while the blue of the cobalt remains unaltered; hence the reducing flame should be tried, if no decided indication of cobalt is obtained in the oxidizing flame. For other and more exact tests for distinguishing cobalt from nickel, special treatises on qualitative analysis should be consulted. (For example, Scott's 'Standard Methods of Chemical Analysis'). Nickel and cobalt being removed from the metals of Group 4 by the means indicated above, the filtrate containing the remaining members of the group is boiled until all the sulphuretted hydrogen is expelled. A little nitric acid is then added, and the solution is again boiled until the greater part of the acid is driven off, when the remaining solution is diluted with water. The small amount of free acid that is still present is neutralized with sodium carbonate, care being taken that no permanent precipitate is formed. The solution is allowed to cool, barium carbonate is added in the cold and the whole is allowed to stand for 15 minutes. The precipitate contains the aluminum, chromium and iron in the form of hydrates, and also the excess of barium carbonate. The filtrate contains manganese and zinc. The precipitate is removed by filtration, dissolved in dilute hydrochloric acid, gently warmed and made alkaline by ammonia. By this process the hydrates of aluminum, chromium and iron are thrown down, free from barium. This precipitate of the hydrates is collected on a filter, dried, transferred to a porcelain dish and dissolved in concentrated nitric acid. A few crystals of potassium chlorate are then added, and the solution is boiled for several minutes. Upon adding sodium hydrate in excess, the iron is thrown down in the form of hydrate, the aluminum and chromium remaining in solution. The iron being removed by filtration, the filtrate is divided into two portions. One of these portions is made acid with nitric acid, and ammonia is added in excess. Aluminum hydrate is thrown down, if aluminum is present. The other portion of the filtrate is made acid with acetic acid, and lead acetate is added. If chromium is present, a yellow precipitate of chromate of lead, $PbCrO_4$, is thrown down. The filtrate from the treatment with barium carbonate, which may contain zinc and magnesium, is heated to boiling, and the barium that it contains is completely precipitated with dilute sulphuric acid. The precipitate of barium sulphate is removed by filtration, and the filtrate is boiled, after addition of sodium hydrate in excess. If manganese is present, it is precipitated in the form of the hydrate, and may be removed by filtration. The filtrate from this operation is acidified with acetic acid, and treated with sulphuretted hydrogen gas. If zinc is present, it is thrown down in the form of a white precipitate of zinc sulphide, ZnS.

Group 5. The metals of this group (barium, strontium and calcium) are isolated, in the general scheme, in the form of carbonates. To separate them from one another, the mixed carbonates are dissolved in dilute acetic acid, and a portion of the solution is tested for barium by the addition of potassium chromate, K_2CrO_4 (not the bichromate, $K_2Cr_2O_7$). If barium is present, a straw-yellow precipitate of barium chromate, $BaCrO_4$, is thrown down. If barium is not present, we may proceed at once to the tests for calcium and strontium; but if it is present, it must first be removed from the solution by cautiously adding potassium chromate until no further precipitate is formed, and then filtering. In this case it is necessary to remove the excess of chromate of potassium before testing for calcium and strontium, because these two metals cannot be separated in the presence of that reagent. For this purpose the filtrate containing the strontium and calcium (which must be perfectly free from barium chromate, even though several successive filtrations may be necessary in order to make it so,) is made alkaline by ammonia, and ammonium carbonate is then added until the carbonates of strontium and calcium are all precipitated, the potassium chromate remaining in solution. After filtration and thorough washing, the mixed carbonates of strontium and calcium are dissolved in hot acetic acid, and the solution is boiled. Dilute sulphuric acid is then added; and if the acid is sufficiently dilute, a white precipitate of sulphate of strontium is thrown down, while the sulphate of calcium (which is formed at the same time) remains in solution. After standing for 15 minutes or more, in order that the precipitation of strontium sulphate may be complete, the solution is filtered, and the clear filtrate is tested for calcium by first adding ammonia until an alkaline reaction is obtained, and then adding a solution of oxalate of ammonia. If calcium is present, a white precipitate of calcium oxalate is obtained.

Group 6. This "group" contains magnesium only. Hence the presence of magnesium will be made apparent at once in the course of the preliminary separation into groups.

Group 7. Potassium, sodium, lithium and ammonium belong to this class. These metals are characterized by the high solubility of all their important salts. Ammonia, being used in the separation of the groups as a reagent, is sure to be present in the final solution that has been designated as containing the metals of "Group 7." Hence if it is desired to test for that substance, the test should be made upon a specimen of the original solution, before any ammoniacal reagent has been added. The test is very simple, and consists merely in heating some of the proposed solution with milk of lime (calcium hydrate in suspension). All salts of ammonia are decomposed in this way, with the liberation of ammonia gas, which may be recognized by its smell or by its turning moist red litmus paper blue. The general nature of the reaction involved in the liberation of ammonia gas may be illustrated by the case of ammonium sulphate. We have $(NH_4)_2SO_4+Ca(OH)_2=CaSO_4+2NH_3+2H_2O$. Sodium, potassium and lithium may be sought for in the final filtrate obtained in the separation of the funda-

mental groups, since no compounds of those metals have been used as "group reagents." They are best identified by means of the colors that they communicate to the flame of a Bunsen burner. For performing a test of this sort, the filtrate containing these metals should be evaporated to dryness in a porcelain dish, and the residue ignited until any ammoniacal salts present are eliminated by volatilization. The dish is then allowed to cool, and its contents are moistened with a few drops of distilled water. A piece of platinum wire is next thoroughly cleaned, moistened with hydrochloric acid and held in the Bunsen flame until it ceases to communicate any color. The wire is then dipped into the solution in the dish, and again held in the flame. Potassium salts give a fine blue color, lithium salts a red and sodium salts an orange yellow. If sodium is present in any considerable amount, its strong, brilliant flame-color is almost certain to obscure the colors due to any other elements present. Chemists therefore make use of colored glasses that are practically opaque to sodium light, using them as screens through which to view the Bunsen flame. The commonest glass of this kind is the "cobalt-blue" glass, which is used for the detection of potassium, since it is quite transparent to the flame-color of that metal.

For methods of examination adapted to the detection of gold, platinum and others of the less common metals, reference must be made to books on chemical analysis.

The metals that exist in a proposed substance being known, it remains to discover in what chemical combinations they are present. It is usually impossible to learn, by mere qualitative analysis, which of the acid radicals that may be present is combined with any given one of the metals; but it is possible to ascertain that certain kinds of compounds (such as sulphates, chlorides and the like), are present and a chemist of experience, who is familiar with the kind of work in hand, can often infer, with considerable probability, how the bases and acids are associated with one another. In the present article it is not possible to discuss this difficult phase of analysis, but a few of the more common tests for the presence of acid radicals may be given.

There is no general scheme for the detection of these radicals, by which they are separated into groups like the metals, and eventually isolated singly. In examining a substance for them, all that can be done is to apply certain tests, largely independent of one another, and best carried out by dividing the original solution into a number of parts, each of which is to be examined for a single class of acid radicals, and then thrown away.

When a solution of barium chloride is added to a neutral or slightly alkaline solution, a precipitate of the corresponding barium compounds is thrown down if the solution tested contains sulphates, phosphates, borates, oxalates, fluorides, carbonates, silicates, tartrates, sulphites, hyposulphites, arseniates, arsenites or chromates. (If the original solution contains lead, silver or mercury, nitrate of barium is used as a reagent in the place of the chloride, because otherwise a precipitate of the chlorides of those metals would also be obtained). The mixed precipitate just obtained is isolated by filtration, washed and treated with dilute hydrochloric acid. All of the compounds named pass into solution, with the single exception of the sulphate; and if a white, insoluble precipitate remains after treatment with dilute hydrochloric acid, the presence of sulphates in the original solution is demonstrated. The hydrochloric acid solution is next made alkaline by ammonia, when a precipitate will again be thrown down, if the original solution contained oxalates or phosphates. Certain other salts also may be thrown down at this point; and, therefore, if any precipitate is obtained, confirmatory tests for oxalic and phosphoric acids should be applied to the original solution before the presence of those substances can be regarded as really proved.

If the original solution contains a carbonate, it will effervesce upon the addition of hydrochloric acid, owing to the liberation of carbon dioxide. If it contains a sulphite, the addition of hydrochloric acid will liberate sulphur dioxide, which is readily recognized by smell. If it contains a hyposulphite, sulphur dioxide will also be liberated, but the solution will at the same time become turbid from the liberation of free sulphur. If it contains an alkaline silicate (other silicates are not soluble in water) in considerable quantity, the addition of hydrochloric acid will cause the silicic acid to separate in the form of a gelatinous precipitate, which, when dried and ignited, is gritty. The presence of the arsenic acids may be established by Marsh's test for arsenic. (See ARSENIC). If a tartrate is present, the original compound, when obtained in the solid state by evaporation or otherwise, is blackened by heat, with a characteristic odor suggestive of burnt sugar. The presence of a fluoride in the original substance is established by the liberation of hydrofluoric acid (see FLUORINE) when that substance is heated gently with concentrated sulphuric acid. The presence of a chromate is indicated by the precipitate from the addition of barium chloride exhibiting a yellow color. As a confirmatory test a solution of lead acetate may be added to a neutralized sample of the liquid under examination. If a chromate is present, a yellow precipitate of chromate of lead is thrown down, which is soluble in caustic soda, but insoluble in acetic acid. To test for the presence of borates, a sample of the original liquid is acidified with hydrochloric acid, and a piece of turmeric paper is wetted with it, thoroughly dried before a flame and finally moistened with a solution of sodium carbonate. If a borate is present, the color of the paper, where wetted with the sodium carbonate, changes to a greenish black.

To test the chlorides and certain other salts, a fresh specimen of the original solution should be chosen, and if it is not already acid, it should be made so with nitric acid. A solution of nitrate of silver is then added, whereupon a precipitate will be thrown down if chlorides, bromides, iodides, cyanides or sulphides are present. (Cyanide of mercury, however, gives no precipitate at this point). The precipitate should be removed by filtration, thoroughly washed and then treated with hot ammonia. The chloride, bromide and cyanide of silver dissolve, while the sulphide and iodide remain behind, unchanged. The sulphide is black, while the iodide is yellowish. For methods of distinguishing be-

tween the chloride, bromide and cyanide precipitates reference must be made to the works on chemical analysis. It may be said, however, that the cyanide, when heated, is reduced to metallic silver, with the liberation of cyanogen gas. The presence of an iodide, when this is made doubtful by the black precipitate due to a sulphide may be further investigated by the iodide of starch test. See IODINE.

Nearly all of the nitrates and acetates are soluble, and hence precipitation tests are not commonly used for the detection of nitric and acetic acids. Color tests are usually employed instead. To test for acetic acid, the original solution may be made neutral, and a few drops of ferric chloride added. If acetates are present, the solution takes on a dark red color, owing to the formation of ferric acetate. To test for nitrates, a portion of the original solution is mixed with a solution of ferrous sulphate in a test tube, and strong sulphuric acid is poured down the side of the inclined tube, in such a manner as not to mix with the contents, but to form a layer at the bottom of the tube. If nitrates are present, a purplish or reddish ring, changing to a dark brown, will be observed at the surface of separation of the two liquids.

QUANTITATIVE ANALYSIS OF INORGANIC SUBSTANCES.

Quantitative analysis is far more difficult than mere qualitative analysis, and cannot be treated adequately in a general encyclopædia. As has been said, unless the nature of the substance is known in some other manner a preliminary qualitative analysis must be made. Several usual methods of making quantitative analyses will be described below.

Electrolytic Method.— When the substance to be analyzed is an alloy, or a simple mixture of metallic salts, its metallic components may often be readily separated by the electrolysis of its solution, the separation of the metals being based upon the known fact that in electrolysis the nature of the deposit depends largely upon the nature and degree of concentration of the solution, the sizes of the electrodes and the strength of the electric current that is employed. By systematic study of the effect of these conditions in the electrolysis of mixtures of metallic salts, it is found to be possible to deposit one metal upon the cathode, while the others remain in solution. The electrolytic method has been developed to a considerable extent, and promised to be of great value. Thus far, however, it is not in extensive general use. For details concerning it, consult Classen, 'Quantitative Analysis by Electrolysis,' and various papers published by Prof. Edgar F. Smith, a few years ago, in the *Journal* of the Franklin Institute. Scott's 'Standard Methods of Chemical Analysis' contains the latest details concerning approved electrolytic methods. See also the article ELECTROLYSIS.

Gravimetric Methods.—Strictly, any method of analysis in which the quantity of each constituent is determined by weighing is a gravimetric method; but the term is usually understood to exclude the electrolytic method just mentioned. In gravimetric work the components that are to be weighed may be separated by fire-methods, or by selective precipitation from solution, as in the scheme of qualitative analysis outlined above. The fire-methods are commonly used in the estimation of gold and silver and are described in the article ASSAYING. The wet methods do not differ in general theory from the method given above for qualitative analysis; for it is evident that any precipitate which contains only one base may be isolated and weighed, and that the quantity of the base present may be calculated from the observed weight of the precipitate, and its known chemical formula. But the practical case is by no means as simple as this statement would indicate, because certain matters of detail, that are not of the slightest importance in qualitative work, must be attended to with great care in quantitative analysis. For example the substance that is to be determined must be isolated by a method that will ensure its perfect separation from every other substance that may be present; that precipitate that is to be weighed must be granular enough to be filtered easily and without loss; the precipitate must not be liable to oxidation nor to other change upon exposure to air for such time as its manipulation may demand; it must be of such nature that it can be thoroughly dried; and it must not be hygroscopic enough to absorb sensible quantities of water from the air, from the time it is dried until the weighing has been completed. Thus in qualitative analysis aluminum may be recognized by the precipitation of the hydrate; but in quantitative analysis it is necessary to reduce the metal to the form of the oxide. The hydrate is usually gelatinous when freshly precipitated, and it retains traces of the acid with which the metal was previously combined, and also traces of the alkali that was used in the precipitation of the hydrate. These facts are of no consequence in qualitative work, but their importance in quantitative investigation is evident.

Volumetric Methods.—In volumetric analysis the quantities that are to be measured are determined by the measurement of volumes, and weighings are resorted to only in the preparation of the standard reagents that are to be used. The reagents are made up in certain standard strengths, according to the purposes for which they are wanted; but the usual strengths are those designated as "normal" and "decinormal" solutions. A "normal" solution is one having such a strength that one litre of the solution contains as many grams of the reagent as there are units in the reagent's chemical equivalent. Thus the chemical equivalent of sodium hydrate, NaOH, is (in round numbers) $23 + 16 + 1 = 40$; and hence a "normal" solution of sodium hydrate is one which contains 40 grams of that substance to the litre. A "decinormal" solution of this reagent contains 4 grams of it per litre, and a "centinormal" solution contains 0.4 gram per litre. If the reagent is a bivalent acid, or a salt of a bivalent base, the number of grams of it present in each litre of solution must be equal to half the molecular weight. Thus sulphuric acid, H_2SO_4, contains two atoms of replaceable hydrogen, and its molecular weight is $2 + 32 + 64 = 98$. Hence a normal solution of sulphuric acid contains 49 grams of the anhydrous acid, per litre of solution. The general idea is to have all of the reagents of such strength that if one cubic centimeter of any "normal" acid solution be added to one cubic centimeter of any "normal"

alkaline solution, the mixture will be precisely neutral. As an illustration of the method that is followed, let it be assumed that a manufacturer buys a carboy of oil of vitriol, and wishes to know what proportion of pure sulphuric acid it contains. If the acid were quite free from water, 49 grams of it would be exactly neutralized by 1,000 cubic centimeters (that is, one litre) of any normal alkali solution. It is more convenient to work with one-tenth of this quantity of acid and reagent; so that the experiment will consist in weighing out 4.9 grams of the oil of vitriol, diluting it with water, adding a piece of litmus paper, and letting a normal alkali solution pass into it (preferably from a graduated burette) until the acid is precisely neutralized. If 100 cubic centimeters of the alkali were required to effect the neutralization, the given sample of oil of vitriol would be known to contain 100 per cent of its weight of sulphuric acid,—or to be entirely free from water. On the other hand, if only 53.9 cubic centimeters of the normal alkali solution were required to effect neutralization, the sample would be known to contain 53.9 per cent of its own weight of sulphuric acid. As a further example, suppose it is desired to ascertain the percentage of sodium oxide present in a given sample of crude soda ash, without raising the question as to whether the sodium actually occurs as oxide, hydrate or carbonate. The formula of sodium oxide is Na_2O, and its molecular weight is $46 + 16 = 62$. As it contains two atoms of sodium to the molecule, we weigh out 3.1 grams (not 6.2 grams) of it, dissolve in water and dilute and add litmus paper as before. Then into the solution we pass a normal acid solution until neutralization is effected. If 46.7 cubic centimeters of the normal acid solution are required, the alkali present in the sample, when computed as sodium oxide, constitutes 46.7 per cent of the weight of the whole. This process is called "acidimetry" when it is used for estimating the strength of acids, and "alkalimetry" when it is used in estimating the strengths of alkalis. As a further illustration of volumetric methods the estimation of chlorine (known as "chlorimetry") may be considered. If the substance to be examined for chlorine is bleaching powder, 10 grams of the powder are dissolved by rubbing with water in a mortar, and the solution is diluted till it occupies a litre. It is then well shaken, and 100 cubic centimeters are drawn off into a beaker, by means of a pipette, and treated with a decinormal solution of arsenious acid (As_2O_3) until a drop of the mixture, when withdrawn by a glass rod, gives no blue stain upon filter paper that has been soaked in starch liquor and iodide of potassium. The number of cubic centimeters of decinormal arsenious acid solution required is to be multiplied by the constant multiplier 0.00355, and the product is the weight of available chlorine in grams, contained in each gram of the original powder. (For explanation of the multiplier 0.00355, and for full details of this process and of volumetric analysis generally, consult Francis Sutton, 'Systematic Handbook of Volumetric Analysis').

The analysis of gases is of so special a character that it is treated under a separate heading. See GASOMETRIC ANALYSIS.

ORGANIC ANALYSIS.

In the analysis of organic compounds, no general scheme can be given, corresponding to that which is used in the systematic examination of inorganic substances. The number of possible organic compounds is so great, that practically nothing can be done in the way of effecting a "proximate" analysis of a compound concerning whose general nature we have no preliminary information. For the more or less general methods that have been developed for the examination of special classes of organic substances, advanced books on organic analysis must be consulted. The ultimate analysis of an organic substance consisting of oxygen, hydrogen and carbon may be effected by burning the substance in a glass tube in a current of oxygen gas. The carbon is converted into carbon dioxide, which is absorbed by potash and estimated quantitatively by observing the gain in weight of the potash; and the hydrogen is converted into water, which is similarly estimated by absorption of calcium chloride. The oxygen of the original compound is then estimated by difference. When nitrogen is also present, the process is somewhat more complicated. In this case the gases of combustion may be passed over red-hot metallic copper to absorb the oxygen, and the nitrogen may be measured in the free state, the oxygen being finally concluded by difference, as before.

Consult (in addition to the works mentioned above), Fresenius, 'Manual of Qualitative Chemical Analysis' and 'System of Instruction in Quantitative Chemical Analysis'; Lunge, 'Technical Methods of Chemical Analysis'; Thorpe, 'Quantitative Chemical Analysis'; Prescott, 'Outlines of Proximate Organic Analysis.'

ALLAN D. RISTEEN.

CHEMICAL CRYSTALLOGRAPHY. Chemical Crystallography is concerned with the relations between the chemical constitution of crystallized substances and the structure of their crystals as revealed by their form and physical characters.

In 1800 Abbé Réné Just Haüy announced that *to every specific substance of definite chemical composition capable of existing in the solid condition there appertains a crystalline form peculiar to and characteristic of that substance.* Despite the many controversies involving polymorphism, and isomorphism, this law needs little modifying and it is still the belief that each chemically definite body crystallizes only in one symmetry class and has *for any definite temperature and pressure* constant angles and constant volume just as it has a definite molecular weight and a definite chemical structure. Furthermore, all the investigations prove that substances in any way chemically different possess different shape and volume.

The observation by Mitscherlich in 1819 that the phosphates of ammonium and potassium and the arsenates of ammonium and potassium occur in very similar crystalline shapes led to the announcement in 1821 of the principle of isomorphism which was in effect that analogous elements can replace each other in their crystallized compounds without any apparent change in crystalline form.

For many years criteria were sought by which substances "truly isomorphous" could be recognized; for instance, similarity in their chemical molecules and reactions, close relations in symmetry and angles and above all capacity to crystallize together in homogeneous mixed crystals *"in which the physical characters are continued functions of their chemical composition."*

It is now established that except in the isometric substances, the replacement of one element by another inevitably produces some change in the angles and sometimes even in the symmetry, and while the change increases in general with increasing chemical dissimilarity there are no sharp lines which can be drawn and series exist with striking resemblances in angles and physical characters and little or no chemical resemblance.

Von Groth in 1870 broadened and systematized the field of chemical mineralogy by directing attention to the definiteness of the changes produced by the replacement of one atom or group by another. For instance, he showed that the derivatives of benzene, C_6H_6, underwent definite changes of structure by the substitution of new atoms or groups, and that even while the crystal system might change there remained a striking similarity in angle in certain zones, and the alteration consisted chiefly in an elongation or shortening of this zone axis, usually a crystal axis. The axial ratios given below show that the change is principally with reference to the $\dot{c}$ axis.

	$\ddot{a} : \dot{b} : \dot{c}$
C_6H_6	0.891:1:0.799
$C_6H_4(OH)_2$	0.910:1:0.540
$C_6H_3(OH)(NO_2)_2$	0.933:1:0.753
$C_6H_3(OH)(NO)_2$	0.937:1:0.974
$C_6H_4(NO_2)_2$	0.943:1:0.538
$C_6H_3(NO_2)_3$	0.954:1:0.733

The study of the changes which result in the crystal structures of different substances when certain atoms or atomic groups are replaced by others necessitates extremely accurate physical and chemical determinations. A deeper insight into the results has been obtained by use of the so-called "topical ratios" or "molecular distance" ratios of Muthmann, which may be explained as follows:

In any space lattice the crystal elements a, β, γ, and a, b, c are theoretically the angles and *relative* lengths of the sides of the elementary parallelopipedon of the crystal structure, but the parameters $a : b : c$ cannot be used directly for comparison between volumes of elementary parallelopipedons because in each such proportion one term is unity and the ratio between the unities is not known.

The assumption, however, is that the volumes of the elementary parallelopipeda are directly as their molecular weights and inversely as their specific gravities and the quotient of the first by the second is called the molecular volume. By appropriate formulæ the relative molecular volumes of different substances may be combined with their respective crystal elements and the topical parameters $\chi : \psi : \omega$ obtained and the relative dimensions of the elementary parallelopipeda of different substances with the same type of space lattice compared term by term, thus making clear the changes which will be produced in any structure by the substitution of one element for another.

For instance, the rhombic series of isomorphous sulphates and selenates of potassium, rubidium and cæsium exhibit the same forms and their corresponding angles vary less than one degree. The calculated topical ratios are:

	χ	ψ	ω
K_2SO_4	3.8810	3.8754	4.9964
Rb_2SO_4	4.0340	4.0039	5.2366
Cs_2SO_4	4.2187	4.1849	5.2366
K_2SeO_4	4.0291	4.0068	5.1171
Rb_2SeO_4	4.1672	4.1315	5.3461
Cs_2SeO_4	4.3457	4.3040	5.6058

From these Tutton concludes that one atom of sulphur or selenium lies between two of the alkali metal and all three extended in the direction of ω because in passing from the sulphate of one metal to that of the next in the periodic classification or from selenate to selenate the principal change is the vertical direction ω whereas in passing from sulphate to selenate of the same metal the horizontal directions χ and ψ are more changed.

Such a series as that mentioned, Tutton calls a *Eutropic series*, the interchangeable elements belonging to the same group in the periodic system, and in such a series the angles and the physical properties of the crystals are functions of the atomic weights of the interchangeable elements. He uses the term *Isomorphous* in a broad sense to include substances which bear some definite chemical analogy, crystallize in the same symmetry class, develop the same forms and differ in angles only by a few degrees, rarely over three.

Possibly the most important general result of the study of morphotropic changes is the proof that the atom has a definite place and exerts a definite influence on the structure, for this must be so if the substitution of one particular element for another produces a quantitative and definitely oriented change in structure in whatever salt the substitution is made.

Polymorphism or Physical Isomerism.—That an element or compound may occur in two or more distinct crystalline forms was first observed by Mitscherlich in 1821, who found that by slowly cooling fused sulphur, monoclinic crystals were developed and that these on standing passed spontaneously, without again being fused, into the usual orthorhombic crystals.

This property, now known as polymorphism, was formerly attributed to a difference in the number of the chemical molecules in the so-called physical molecules, but is now regarded as due to the existence of different positions of equilibrium in the homogeneous arrangement of the atoms, each position being most stable at a particular temperature.

Many substances have been shown to present two or more solid "phases," each characterized by specific form, optical properties, melting point, specific gravity, etc., and, while in general each "phase" has certain temperature limits beyond which it cannot exist it is possible for two modifications to exist under the same conditions when once formed, though one is the less stable and sometimes passes gradually or suddenly to the more stable modification.

Polymorphism must not be confounded with "chemical isomerism" in which the differences between two substances with the same percentage composition are due either to the different number of atoms or the different linking of the atoms in the chemical molecule.

The distinction between polymorphism and chemical isomerism can sometimes be made by melting or dissolving the substance. In the resultant amorphous condition all differences due strictly to crystal structure disappear.

In chemical isomeres on the contrary, fusion or solution does not destroy the differences. Lehmann states that in such fusions or solutions of polymorphic substances crystals of either modifications grow further on being placed in contact with the amorphous liquid mass, but such a solution or fusion will in contact with a chemical isomere usually grow only its own kind of crystal.

Adding one chemical isomere to the other raises or lowers the melting or freezing points, whereas adding one polymorphous form to the other does not, there results always the melting point of the more stable form.

Polymorphism must also be distinguished from "polysymmetry" or the tendency of crystals of a substance of a certain grade of symmetry to unite to apparently simple forms of higher symmetry. For instance, substances which are orthorhombic, monoclinic or triclinic often unite to apparently hexagonal forms, and although twin lamellæ usually reveal the composite structure, at times repeated twinning may yield a structure in no way distinguishable from that of a hexagonal crystal.

In such a case, however, the physical properties are those of the original less symmetrical material and intermediate states usually can be found, whereas in the polymorphous substance the "phases" differ in their physical characters.

When a fused compound capable of assuming different "phases" is cooled, the temperature falls steadily until the transformation temperature is reached when the rate suddenly changes and coincidently the physical properties and crystalline form change. For instance, according to Lehmann, the ordinary orthorhombic crystals of ammonium nitrate melt at about 168 degrees. If such a melted mass is gradually cooled there form eight-rayed skeleton crystals, isotropic in polarized light, which at 127 degrees suddenly become doubly refracting, increase in size and become rhombohedra. At 87 degrees acicular orthorhombic crystals develop regularly about the rhombohedral crystals. These phenomena are obtained in reverse order if the cooled mass is reheated gradually.

Morphotropic Relations between Polymorphs.— An interesting empirical relation exists between polymorphic modifications which may be expressed as follows: If comparable "set-ups" have been chosen then the products of each crystal volume by the corresponding specific gravity are in simple mathematical ratio. By crystal volume is meant the volume of the unit pyramid. For example:

	Crystal Vol.	Sp. Gr.	Product	Ratio
Marcasite	2.094	4.86	10.18	2
Pyrite	1	5.10	5.10	1
Senarmontite	1	5.25	5.25	1
Valentinite	9.179	5.72	52.50	10
Calcite	0.7399	2.713	2.0072	3
Aragonite	0.4489	2.95	1.324	2
Octahedrite	0.71084	3.84	2.7296	1
Brookite	0.6667	4.065	2.7101	1
Rutile	0.6440	4.239	2.730	1

Enantiomorphism.—Pasteur in 1848 showed that racemic acid decomposed by solution into two varieties of tartaric acid and that while the solution of one possessed the power to rotate the plane of polarization to the right the solution of the other rotated this plane a corresponding amount to the left, and that the crystals of these two varieties were enantiomorphic mirror images of each other (like right and left hand). Further study led to the discovery that the same relations existed in other so-called optically active compounds.

Such a result is attributed to enantiomorphous chemical molecules and resultant enantiomorphous crystal structures, the structure of the racemic acid corresponding to an interpenetration of the two enantiomorphous structures.

Structure Indicated by Formula.—An interesting relation between chemical composition and crystalline form was shown by Tschermak in 1903. If the repetition of equivalent directions in the crystal corresponds to repetition of corresponding atoms or groups this is likely to show even in the simpler formulæ. Thus many rhombohedral minerals show a three-fold arrangement in the formula which may be written as A_2B whereas in tetragonal minerals there is a tendency to the four-fold A_4B in isometric to either three-fold or four-fold, and in hexagonal the six-fold, A_6B may be assumed, A corresponding sometimes to one member as O, Cl, H_2O, and sometimes to a pair. Examples are:

Rhombohedral	Proustite	3 Ag S. As	Hematite O_3Fe_2
Tetragonal	Zircon	O_4Zr	Cassiterite O_2Sn
Isometric	Eulytite	$Bi_4(SiO_4)_3$	Senarmontite O_3Sb_2
Hexagonal	Beryl	$6(SiO_3)\ Be_3Al_2$	

See CRYSTALLOGRAPHY; CRYSTAL; CRYSTALLO-CHEMICAL ANALYSIS; PHYSICAL CRYSTALLOGRAPHY; MINERALOGY.

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ALFRED J. MOSES,
Professor of Mineralogy, Columbia University.

CHEMICAL EXTINGUISHERS. See FIRE PROTECTION.

CHEMICAL INDUSTRY, The. According to the statistics published (1916) in the report of the United States Census Bureau covering the special census of manufactures taken for the year 1914, the American chemical industry ranks among the largest manufacturing interests in the country. Outranked only by such industries as those of iron and steel, woolen goods and cotton manufactures — for it must be remembered that cattle killing, the making of boots and shoes and of clothing, as well as several other "assembling" industries, are not accounted as manufactures proper by the census statisticians — it also represents a wider diversity of interests than any other of the great industries which combine to represent the source of revenue that has made the United States the most prosperous of nations.

At the same time, it is somewhat remarkable to recall what a brief period of existence this industry has had in the United States. Great

as the proportions are to which it has attained to-day, not one of its products are known to have been made in America prior to about 100 years ago: to-day, scarcely a State in the Union that cannot boast of prosperous chemical establishments, and less than a century ago, not one such factory anywhere in the country.

According to the best reports that are obtainable, the first attempt to manufacture chemicals in any considerable quantity was made in 1810, when 8,000 pounds of copperas were produced in Vermont, and a lesser amount in Maryland. Three years later an equally successful attempt was made to manufacture alum in Maryland, and, in 1816, a Baltimore house began to make chemicals, paints and medicines for the general trade. It is true that some oil of vitriol had been made in Philadelphia as early as 1793, but the quantity was so small as to be scarcely worthy of notice except as a historical incident. According to the census reports of 1820, there were but two chemical manufactories in the entire State of New York.

In spite of this small beginning the chemical industry spread so rapidly that, by 1830, it had become a trade of considerable importance to the country. Prior to about 1815 everything needed in this line had been imported from Europe and as this necessitated the addition of transportation and other charges to the original cost, the American manufacturers who had need of such products in their factories and shops were very glad to learn that such materials might be produced in their own land. For economy's sake, if for no other reason, therefore, they were ready to patronize any local firm that would undertake to make the chemicals they required, so, in 1830, the census reports told a different story.

Whereas, in 1820, the chemical industry had been worthy of slight notice, 10 years later it had been extended to such a degree that the 30 firms then engaged in the business represented an invested capital of $1,158,000, and an annual product of fully $1,000,000. Alum, copperas and several other articles were then so largely manufactured in America that the foreign product had been almost entirely excluded from this market. And in addition, the list of American productions then included calomel and a number of other mercurial preparations, Rochelle and Glauber's salts, ammonia, oil of vitriol, sulphate of quinine, tartar emetic, Prussian blue, chrome yellow, chrome green, refined saltpetre, borax and camphor, acetate and nitrate of lead, prussiate and bichromate of potash and tartaric, nitric, muriatic, oxalic and acetic acids.

Great as this advancement was, however, those who compare this first report of a practically infant industry with the census figures that were gathered in 1914 will have a striking illustration of the manner in which these great manufacturing interests have extended their operations.

A summary of the chemical industry in 1909 showed 2,140 establishments in operation, with a combined capital of $483,729,410. There were engaged in conducting the business, as officers, firm members and clerks, 17,671 persons, whose salaries amounted to $86,743,333; and 70,426 employees, whose wages amounted to $38,658,201. The cost of materials was $258,115,971, and the value of the products was $425,084,540 — the value added by manufacture being, therefore, $166,968,565.

The rapid growth of the industry may be noted by comparing with the above figures those of the special census of 1914, as follows: In that year there were 2,461 establishments employing $722,988,871 capital. Officers, firm members and clerks numbered 24,670, whose salaries aggregated $36,631,960. Employees numbered 86,788, whose wages amounted to $53,021,371. The cost of raw materials used amounted to $340,216,702 and the value of the product was $547,801,957 — the value added by manufacture being $207,585,235.

Among all the strictly chemical products the most important is and has long been sulphuric acid, owing to the supremacy which it maintains over all other known chemicals in the promotion of the great manufacturing interests. A comparison of the quantities produced during the several census years, therefore, as well as a comparison showing the reduction of prices that has obtained, will give the reader a very good general idea of the marvelous advancement that has been made in the manufacture of chemicals in the United States.

Among the allied industries the refining of petroleum takes first rank in value of output, reaching nearly $400,000,000; with the fertilizer industry second, with products valued at over $168,000,000. The latter figures are particularly interesting because, if for no other reason, they indicate quite clearly the growth and development of the agricultural interests of the country.

Of course, the history of the farming industry in the past has been a record of gross ignorance and prodigal wastefulness, especially in the matter of fertilization. Through carelessness, or, perhaps more often, through want of thorough knowledge of his trade, the American farmer has permitted vast quantities of valuable manurial materials to soak into ground where they could be no use, or to find their way to the sea. In the old days, instead of devising some method of preventing such waste in the future, the agriculturist continued his primitive methods, until, at last, the manufacturer of artificial fertilizers came to his assistance, and, by the aid of chemicals and mechanical devices, converted worthless matter into valuable merchandise.

To obtain a general idea of the use to which this product of the chemical arts is put by the farmers of the United States it is only necessary to make a brief computation. Thus, for example, we may say that 300 pounds of fertilizers are used to an acre of land; and, as the total output of the country aggregated 33,654,000,000 pounds, it is easy to see that it would require no less than 112,200,000 acres to exhaust such a product. As the figures of the Agricultural Department now show that large areas of this country are already becoming unprofitable as farming lands unless artificial fertilizing is to be used to enrich them, it is not surprising that great manufactories for the making of such materials should have been established in so many sections of the country, and that the output of fertilizers in 1914 should be five times that of 1900.

As classified by the census bureau, the chemical industry has two grand divisions: The gen-

eral chemical industry, and the allied industries — those in which the processes of manufacture are essentially chemical. The latter group includes (1) manufacture of dyestuffs and tanning extracts; (2) manufacture of essential oils; (3) manufacture of explosives; (4) the fertilizer industry; (5) paint and varnish industry; (6) petroleum refining; (7) manufacture of soaps; (8) wood distillation. The general chemical industry covers the manufacture of strictly chemical substances, and is subdivided according to products, as follows:

Acids, comprising chiefly sulphuric, nitric and mixed acids, and other acids used largely in commercial quantities for manufacturing purposes. In 1914 there were 194 establishments making sulphuric acid. Their combined output of acids for sale reached a value of $15,395,133. At least as much more was made and used in the plants making it, and did not pass directly into commerce. The output of 50-degree (Baumé) acid was 1,677,649 tons (of 2,000 pounds), of which 451,121 tons were sold for $2,709,350; of 60-degree acid, 795,489 tons, of which 545,562 tons were sold for $3,754,866; of 66-degree acid, 828,466 tons, of which 732,186 tons were sold for $8,042,422; and of oleum or fuming acid 77,758 tons, of which 62,354 tons were sold for $888,495. The production of 50-degree acid exceeded in quantity that of 1909 by only 2.1 per cent, but the output of 60-degree acid was 320 per cent, and of the 66-degree acid 49.9 per cent greater than that of 1909.

Nitric acid was made in 52 establishments, whose combined output was 78,589 tons, of which 14,685 tons sold for $1,591,625 — an increase of 17.3 per cent since 1909.

Mixed acids (sulphuric and nitric) were made by 37 establishments, with an output of 112,124 tons, of which 42,725 tons were sold for $2,204,480 — an increase over 1909 of 49.4 per cent in the quantity made though but 18.5 per cent in the price received.

Citric acid was made in three establishments whose production was 2,657,840 pounds, valued at $1,516,336 — an increase of 95.1 per cent in value, and 26.4 per cent in quantity.

Muriatic or hydrochloric acid was made in 31 establishments whose output was 337,167,882 pounds, of which 170,876,878 pounds were sold for $1,348,805 — a decrease of 15.9 per cent in quantity and 23.3 per cent in value as compared with the figures for 1909.

Oleic acid was manufactured in seven establishments, the output aggregating 23,187,570 pounds, of which 21,932,736 pounds were sold for $1,301,353 — an advance of 34 per cent in quantity and 54 per cent in value over 1909.

Acetic acid was made in 13 establishments, the output aggregating 75,303,375 pounds, of which 70,617,637 pounds were sold for $1,272,294 — showing an increase of 24.1 per cent in quantity made, and a decrease of 4.8 per cent in the price received.

Stearic acid was made in 10 establishments whose combined output was 14,351,404 pounds, valued at $1,242,492 — an increase of 8.7 per cent.

No other acids reached a production valued at $1,000,000.

Alums engaged 19 establishments with a total output of 313,712,000 pounds, valued at $3,467,969 — an increase of 13.5 per cent in quantity and 14.7 per cent in value.

Bleaching Materials were made in 51 establishments, and their output was valued at $4,964,403, an increase of 54.4 per cent since 1909. These products include chloride of lime or bleaching powder, chloride of soda and other hypochlorites, hydrogen peroxide (or dioxide), sodium (and other) peroxide (or dioxide), bisulphites of soda, lime, etc., chlorine, sulphur dioxide, lime-sulphur solutions, etc. Hypochlorites constitute the most important class, aggregating 222,152,000 pounds, valued at $2,578,269, an increase over 1909 of 90.2 per cent in quantity and 44.3 per cent in value. Of the total value, $1,714,837 was gained by electrochemical processes. Hydrogen peroxide engaged 20 establishments whose combined output was 32,594,807 pounds, valued at $1,303,596 — an increase of 49.7 per cent since 1909.

Cyanides were made in six establishments, the production amounting to 16,450,225 pounds, valued at $2,398,674 — an increase of 23.5 per cent over the figures of 1909.

Plastics, including pyroxylin (under various trade names — celluloid, fiberloid, viscoloid, xylonite, etc.), viscose, artificial silk, bakelite, rubber substitutes, and all plastic materials based on rubber, gutta percha, fibrin, casein, gluten, gums, glue, etc., as cementing agents, engaged 24 establishments which produced materials valued at $13,895,784 — an increase over 1909 of 86 per cent.

Sodas and Sodium products were made in 68 establishments. The output was 1,371,105 tons of soda, valued at $22,616,696, and 169,049 tons of sodium salts valued at $8,280,572. The increase since 1909 was 41.7 per cent in quantity and 12.7 per cent in value.

Gases, compressed and liquefied, were made in 127 establishments whose output was valued at $8,097,720 — an increase of 56.2 per cent over 1909.

Electric Chemicals — those made by the aid of electricity—included aluminum; phosphorus; silicon; sodium; carbon in its allotropic form of graphite or plumbago; chlorine; oxygen; hydrogen; ferro-alloys; copper, titanium, and vanadium compositions and other alloys; carborundum; alundum; caustic soda; caustic potash; sodium peroxide; chloride of lime and other hypochlorites; bisulphide of carbon; and muriatic acid. The electrical production in the iron and steel industries is not included. These substances were manufactured in 36 establishments, and the output was valued at $29,661,649 — an increase of 60 per cent over the 1909 value. The products of largest value were ferro-alloys, $2,859,482; caustic soda and potash and lye, $2,309,511; hypochlorites, $1,714,387; and chlorates, $1,131,316.

Potash and potassium products engaged 39 establishments whose total output was valued at $4,094,927.

Coal-tar Products were made in 40 establishments whose output was valued at $8,839,506. These figures do not include the by-products of coking plants. Of the total value, the manufacturers of synthetic dyes produced $4,652,947, and the manufacturers of coal-tar medicines, $774,350.

Fine Chemicals.—This division includes the high grade chemicals rated "C.P.," or chemically

pure, as well as many laboratory products. Their combined value was $10,316,519.

THE ALLIED INDUSTRIES.

Dyestuffs and Extracts.—The manufacture of natural dyestuffs and tanning extracts engaged 112 establishments, whose total product was valued at $20,576,769 — an increase of 29 per cent since 1909.

Essential Oils were made in 108 establishments (of which 53 were in Michigan and 29 in Indiana) whose total output was valued at $2,565,361 — an increase of 44.7 per cent since 1909.

Explosives were made in 111 establishments, the combined output aggregating in value $41,453,339 — an increase of 3.5 per cent since 1909.

Fertilizers engaged 1,124 establishments whose combined output was 16,827,000 tons, valued at $168,388,405 — an increase of 50.5 per cent since 1909.

Paints and Varnishes were made in 855 establishments, of which 618 were devoted to paints and 237 to varnishes. The paint production was valued at $113,953,084, and the varnish production at $35,096,736, a combined value for this section of $149,049,820 — an increase over the 1909 figures of 16.9 per cent. A subsection is made of the 46 additional establishments which manufacture boneblack, carbon black and lampblack, to the value of $2,949,797 — an increase of 38.1 per cent since 1909.

Petroleum Refining engaged 176 establishments whose combined products were valued at $396,361,405 — an increase of 67.2 per cent since 1909. These establishments consumed as raw material 191,262,724 barrels of crude oil, and produced naptha and gasoline, illuminating oils, fuel oils, lubricating oils, greases, paraffin wax, etc.

Soap manufacture engaged 513 establishments, whose combined production was, in value, $135,340,499 — a decrease of 2.5 per cent from the 1909 figures. The output comprised 2,064,288,000 pounds of hard soaps, 57,000,000 pounds of soft and liquid soaps and 45,419,827 pounds of glycerine, the last named valued at $7,562,423 above the value of the soap production.

Wood Distillation was conducted in 101 establishments, the output being valued at $10,236,332 — a very slight increase over 1909. The figures include the output of 14 establishments engaged in making turpentine. Other products were 7,196,975 gallons of wood alcohol, as well as acetate of lime, acetone, formaldehyde, acetic acid, wood creosote, etc.

Chemical production comprises such an infinite variety of combinations of raw materials that it is almost impossible to give anything like a detailed view of the subject without going far beyond the restrictions which space fixes upon such an article as this, and yet it is to this variety of raw materials, as well as to its almost numberless combinations, that the chemical industry owes its unique position in the commercial world. Although it is impossible to give all the raw materials and their combinations, it may be said in brief that scarcely any substance on the face of the earth, from the purest water to the blackest tar, fails to find a new utility in the chemist's hands. And thousands of industries exist not only in the United States, but in foreign lands as well, solely to supply the raw materials needed in the chemical industry. Some little idea as to the enormous quantities of raw materials thus consumed may be gained by figures for some of the principal substances as given in the 1914 census. The amount of petroleum so used was 28,689,400 tons; of iron pyrites, 1,581,600 tons; of nitrate of soda, 412,748 tons (all from Chile); of sulphur, 82,248 tons.

In the United States the manufacturers of chemicals have such a wide range of territory from which to select their location that they have not infrequently constructed their plant in some position of convenience to their natural products. The markets for such chemical productions, however, are far apart, but they may be classified in a list of such attractive points as the great centres of the textile manufacture, of the dyeing and bleaching works, the great oil refineries, the artificial manure works, etc.

The processes that are used in the making of chemicals are almost as varied as its products, and yet there are certain mechanical steps that are utilized by all of them. Such, for example, are the grinding, furnacing, dissolving, separating, evaporating, filtration and crystallization processes. In each of these the laws governing chemical constitution are closely followed, while, from time to time, processes are improved by inventions, as the competition of the age increases the demand for quicker, surer and more economical methods. Some of the present-day chemical operations are still the result of a long and complicated treatment. There are instances in which crystallization and decomposition take place very slowly, for both are hastened or retarded by many physical conditions; both heat and cold, like extreme agitation and absolute quietude, are often required by the chemist. Moreover, when we remember that some of these long and complicated processes include, perhaps, a continued series of dissolvings alternating with as many crystallizations, it is not difficult to imagine why it should be necessary for manufacturers to have such an abnormally large capital before they can establish themselves successfully in the industry of producing chemicals.

Moreover, it is not money alone that is needed for one to be able to successfully conduct a manufacturing chemical establishment. A quarter of a century ago money and a little knowledge was all that was required of the ordinary manufacturer. To-day, however, all this has changed. During the past 30 years scientific Germany has devoted much time and attention to chemical researches, and with such results that the rest of the world's manufacturers have had all they could do to keep abreast of the times. To-day it is the chemical laboratory that is the pulse of the entire factory. It must be well equipped with the most modern apparatus, operated by workers of rare skill, for each step in the process is watched and regulated by a continuous series of tests by the laboratory force.

Chemical engineering is another branch of the industry to which much attention has been devoted during the past 30 years, and its importance as a factor in the adjustment of plants to the exigencies of the many difficult and complicated operations to which the works must be adapted has led to the establishment of courses

in chemical engineering by several of the leading institutions of technical education.

The effect of the European War upon the chemical industry of the United States has been remarkable. Previous to the outbreak of that great conflict, the world trade in many chemicals was supplied principally by Germany, Austria and England. But since the war closed the ports of Germany and Austria, and the English plants turned to the manufacture of munitions, the chemical trade of the United States has faced an unprecedented demand not only in its own country, but from abroad. While figures for the home trade are not available, the records of the Bureau of Foreign and Domestic Commerce as to the exports from year to year show the response of the chemical manufacturers to the foreign demand. The open figures following are those of the exports of leading chemicals for the year ended 30 June 1916: the figures in parentheses are for the fiscal year ended 30 June 1914 — the year immediately preceding the war.

Acids: sulphuric, 82,020,246 pounds, valued at $1,990,532 (in 1914, 12,131,750 pounds, valued at $125,892). Other acids, a value of $22,717,335 (in 1914, $357,035).

Copper sulphate, 17,978,242 pounds, valued at $2,469,437 (in 1914, 7,375,775 pounds, valued at $330,007).

Dyes and Dyestuffs, a value of $5,102,002 (in 1914, $356,919).

Extracts for tanning, a value of $5,902,709 (in 1914, $639,941).

Sodium compounds, a value of $12,649,854 (in 1914, none at all).

All other chemicals exported, $62,765,752 (in 1914, $16,201,563). The total value of chemicals exported was $113,597,711 (in 1914, $18,011,358).

Among the "Allied Industries," the only notable increase in exports was in explosives, which reached a value of $467,082,000 (in 1914, $6,272,000).

As to the geographical distribution of the increased export trade in chemicals, it is interesting to note that France and Great Britain took nearly all of the sulphuric acid, and a large part of "all other acids"; Greece, Canada, Mexico and Japan being the other principal buyers. The increased exports of copper sulphate were taken by Greece, Italy, Canada, Mexico, Argentina, Brazil, Dutch Guiana and Uruguay. The dyestuffs (chiefly natural dyes) went to Great Britain, France, Italy, Spain, Japan and Canada. The sodium compounds were bought by France, Great Britain, Holland, Norway, Canada, Mexico, Cuba and Latin America, with smaller quantities to Japan and Russia. The tanning extracts went to nearly every part of the world, many countries being purchasers for the first time.

It is worthy of note that in 1906 (the latest complete figures available) the total trade of the world in chemicals, drugs, dyes and fertilizers, amounted to $592,467,000, and that the contribution of the United States to this market was but $41,000,000, or about 7 per cent. Germany's export chemical trade at that time was $111,000,000, or 17 per cent, and that of the United Kingdom, $63,019,000, or 11 per cent of the whole. While the figures for these latter countries have not changed considerably, the advance of the chemical exports of the United States to $113,600,000 establishes a new world's record for the United States.

RICHARD FERRIS,
Editorial Staff of The Americana.

CHEMICAL MINERALOGY. See MINERALOGY.

CHEMICAL SENSE IN ANIMALS. See ANIMALS, CHEMICAL SENSE IN.

CHEMISTRY, the science which deals with the composition and transformations of matter, had its origin in remote antiquity. In its earliest form it was purely empirical, a mass of disconnected facts which were brought to light in the natural course of development of various industries. In the extraction of metals from their ores, in the preparation of drugs and medicines, in the processes of dyeing and the like, many chemical data were discovered; and of such facts a large number were known to the ancient Egyptians. Indeed, one plausible derivation of the word "chemistry" is from Khem, an early name for Egypt, which has reference to the blackness of its soil. With this name the Arabic word *chema,* to hide, seems to have some relation; and when we remember that much ancient learning was preserved for us by Arabian scholars, the descriptions of chemistry as the Egyptian science, or as the hidden or occult art, become intelligible. Secrecy was a characteristic of its early practitioners.

The one fundamental fact of chemistry is, that matter can undergo apparent transformations of kind, one substance being converted into another. For instance, wood becomes charcoal, and iron is changed to rust; and facts like these were evident even to the most primitive observers. As philosophy developed, these data were necessarily considered, the nature of matter was discussed and attempts were made to correlate and explain the phenomena. Much of the early speculation was vague and mystical, and has little significance to-day; but a part of it was intensely practical, and gave a definite purpose to investigation. If matter can be transformed from one substance to another, why should not the possibility of change be universal? All metals, it was seen, had certain properties in common, and so transmutability between them was almost taken for granted. Thus alchemy arose, with its search for the philosopher's stone and its attempts to convert base metals into gold; and from alchemy the chemistry of to-day is lineally descended. The discoveries, even the failures, of the alchemists laid the foundations of our modern science, and pointed out the best paths for investigation to follow.

The Greek philosophers, and especially Aristotle, in their attempts to interpret matter, assumed the existence of four elements, namely, earth, water, air and fire. These names, however, denoted properties rather than things, and implied the attributes of coldness, wetness, dryness and heat. The properties of matter were determined by these conditions, and could be expressed by the varying degrees under which the latter were displayed. Of chemical combination, as we understand it, the ancients seem to have had no clear conception; they sought to solve the problems of the universe by reasoning alone; the experimental method as a test of truth had not become a court of last appeal. To the alchemists, on the other hand, and to

their successors, the iatrochemists, who applied chemistry to medical uses, experiment was the essential thing; and in their hands true knowledge rapidly increased. The alchemical elements, salt, sulphur and mercury, were still names of properties; but they represented conceptions which stood closer to reality than the earlier ideas, since they were based upon more exact observations. Speculation had not been dethroned, but it was no longer an absolute ruler.

To trace the history of chemistry during its formative period would be impracticable in an article of the present scope. It is enough to say that the modern distinction between elements and compounds was first clearly stated by Robert Boyle in 1661. An element is a substance that cannot be further decomposed, but which is obtainable from a compound body, and from which the latter can again be prepared. He also held that chemical combination consisted in an approximation of the smallest particles of matter, thus adopting the atomic hypothesis which had been current in philosophy from the very earliest times. With these teachings of Boyle modern chemical theory practically began.

The chemical researches of the 18th century were many and varied, but most of them, at least during the earlier decades, were essentially qualitative in character. The fundamental importance of exact weight and measure came into recognition with extreme slowness. Throughout the greater part of the century one theory dominated chemical thought, the theory of *phlogiston,* proposed by Becher, but developed and completed by Stahl. The phenomena of combustion had always attracted the attention of chemists, and the new theory was devised to explain them. Every combustible body was supposed to contain a peculiar non-isolable substance, *phlogiston;* and when combustion took place this substance was thought to be expelled. Thus lead, when heated in the air, undergoes a change analogous to that produced by combustion, and yields a calx, or, as we call it now, an oxide. This calx, combined with phlogiston, was thought to exist in the original metal, and to be freed from phlogiston when calcination occurred. In this speculation no account was taken of the weight of the several bodies, and the fact that the calx was heavier than the metal, that a gain, not a loss, was observed, seemed to offer no difficulty to the believers in the phlogistic doctrine. To phlogiston a negative weight was ascribed, and by this device the real difficulties of the problem were comfortably laid aside.

In 1774 Joseph Priestly, himself a believer in phlogiston, discovered oxygen; and so made, though unwittingly, the true interpretation of combustion possible. In 1766 Cavendish had discovered hydrogen; and in 1781 he proved that water was produced by the union of the two new gases. Cavendish also determined the composition of the atmosphere, and in these researches the foundations of a new chemistry were laid. The two chief architects to build upon the foundation were a Frenchman, Lavoisier, and an Englishman, Dalton.

Lavoisier, by careful use of the balance as an instrument of research, proved that matter was constant in weight, and could neither be created nor destroyed. In any chemical change the weight of the substances engaged in the reaction remained unaltered. Studying combustion he showed that it was merely combination with oxygen; and he pointed out that respiration was a phenomenon of the same character. He also gave greater precision to the idea of an element, and announced the elementary nature of the metals; and, in conjunction with other chemists, did much toward the establishment of a rational system of chemical nomenclature. Hitherto the names of compounds had been arbitrary and often meaningless; now they were made to express with more or less accuracy the composition of the substances described.

Lavoisier died in 1794, a victim of the French Revolution; and it was not until 1803 that the next really great forward step in chemistry was taken by Dalton, who then first announced his famous atomic theory. To support this doctrine, which, being quantitative in form, had little in common with the atomistic speculations of the philosophers, Dalton established two laws, the laws of definite and multiple proportions. That every chemical compound has a fixed and definite composition was recognized by Lavoisier and by other writers before him, but the fact was disputed by Berthollet, and it remained for Dalton to give its statement a precise form. Dalton then went further, and found that to every element a definite combining number could be assigned, and that when two elements united in more than one proportion, even multiples of that number appeared. Thus, taking the hydrogen weight as unity, the standard of comparison, oxygen always combines with other elements in the proportion of eight parts or some simple multiple thereof, and so on through the entire list of elementary bodies. Each one has its own distinct combining weight, and this was a condition which Dalton sought to explain. Fractions of the weights did not occur, fractional atoms could not exist, and the two thoughts were connected by Dalton. Chemical union, to his mind, became a juxtaposition of atoms, whose *relative* weights were indicated by their combining numbers; and so the atomic conception was for the first time given a clear, quantitative expression. First, every element is composed of similar atoms which have constant weight. Secondly, chemical compounds are formed by the union of these atoms in simple numerical relations. Upon these fundamental statements the entire system of chemical philosophy rests, so that for a hundred years the history of chemistry has been the history of the atomic theory. All chemical calculations are based upon the atomic weights of the elements, and in all chemical formulæ they are implied.

Since Dalton's time great labor has been expended upon the exact determination of atomic weights, and in the discovery and description of new elements and compounds. The general conclusions which have been established by this class of researches may be summarized as follows: Every chemical substance is either an element or a compound. The elements, which are not artificially separable into any simpler bodies, at least by no means yet discovered, are comparatively few in number; the compounds are innumerable. More than a hundred thousand compounds are already known. A compound may be separated into its elements

or built up from them; and its composition is absolutely invariable. In this respect compounds differ from mechanical mixtures, in which any proportion may occur. Flour and sugar may be mixed together, but they still remain flour and sugar, each with its properties unchanged; no combination here takes place. In combination, as when *gaseous* hydrogen and *gaseous* oxygen unite to form *liquid* water, they do so only in one fixed proportion and the characteristics of the original substances disappear. This fact of combination, the union of two or more bodies to form others which are widely different from them, is clear; but its mechanism is not yet understood. The elementary atoms of the compound are drawn and held together by some form of attraction, but its precise nature is unknown. The object of chemistry is to discover the laws which govern the union or the decomposition of substances, and to determine the limits within which such changes are possible. For the study of compounds, at least for the purpose of ascertaining their composition, two methods are employed. First, *analysis,* in which the component parts of the compound are separated, and individually identified. Secondly, *synthesis,* in which the parts are forced to unite, and to form the compound which happens to be under investigation. Furthermore, analysis may be either *qualitative* or *quantitative.* In one case we merely ascertain what substances are present, in the other we determine their exact quantity. The elements now known, about 80 in number, are given in the following table, together with their atomic or combining weights and their symbols. The latter are abbreviations whose use will be explained presently.

INTERNATIONAL ATOMIC WEIGHTS, 1916

	Symbol	Atomic weight
Aluminum	Al	27.1
Antimony	Sb	120.2
Argon	A	39.88
Arsenic	As	74.96
Barium	Ba	137.37
Bismuth	Bi	208.0
Boron	B	11.0
Bromine	Br	79.92
Cadmium	Cd	112.40
Caesium	Cs	132.81
Calcium	Ca	40.07
Carbon	C	12.005
Cerium	Ce	140.25
Chlorine	Cl	35.46
Chromium	Cr	52.0
Cobalt	Co	58.97
Columbium	Cb	93.5
Copper	Cu	63.57
Dysprosium	Dy	162.5
Erbium	Er	167.7
Europium	Eu	152.0
Fluorine	F	19.0
Gadolinium	Gd	157.3
Gallium	Ga	69.9
Germanium	Ge	72.5
Glucinum	Gl	9.1
Gold	Au	197.2
Helium	He	4.00
Holmium	Ho	163.5
Hydrogen	H	1.008
Indium	In	114.8
Iodine	I	126.92
Iridium	Ir	193.1
Iron	Fe	55.84
Krypton	Kr	82.92
Lanthanum	La	139.0
Lead	Pb	207.20
Lithium	Li	6.94
Lutecium	Lu	175.0
Magnesium	Mg	24.32
Manganese	Mn	54.93
Mercury	Hg	200.6
Molybdenum	Mo	96.0
Neodymium	Nd	144.3
Neon	Ne	20.2
Nickel	Ni	58.68
Niton (radium emanation)	Nt	222.4
Nitrogen	N	14.01
Osmium	Os	190.9
Oxygen	O	16.0
Palladium	Pd	106.7
Phosphorus	P	31.04
Platinum	Pt	195.2
Potassium	K	39.10
Praseodymium	Pr	140.9
Radium	Ra	226.0
Rhodium	Rh	102.9
Rubidium	Rb	85.45
Ruthenium	Ru	101.7
Samarium	Sa	150.4
Scandium	Sc	44.1
Selenium	Se	79.2
Silicon	Si	28.3
Silver	Ag	107.88
Sodium	Na	23.00
Strontium	Sr	87.63
Sulphur	S	32.06
Tantalum	Ta	181.5
Tellurium	Te	127.5
Terbium	Tb	159.2
Thallium	Tl	204.0
Thorium	Th	232.4
Thulium	Tm	168.5
Tin	Sn	118.7
Titanium	Ti	48.1
Tungsten	W	184.0
Uranium	U	238.2
Vanadium	V	51.0
Xenon	Xe	130.2
Ytterbium (Neoytterbium)	Yb	173.5
Yttrium	Yt	88.7
Zinc	Zn	65.37
Zirconium	Zr	90.6

In addition to these elements there are several others which are as yet incompletely known. Among them, polonium, actinium and ionium may be named. New elements are not infrequently discovered, and argon, helium, neon, xenon, krypton and radium have all been brought to light within recent years.

With the help of the elementary symbols, chemical formulæ can be constructed, and these are of great help in chemical calculations and reasoning. Some of the symbols are initial letters only, as H, O, N, C, for hydrogen, oxygen, nitrogen and carbon; others are formed of two letters, like Ca for calcium and Zn for zinc. Still others are derived from the Latin names of the metals, such as Ag from *argentum,* silver, Fe from *ferrum,* iron, etc. The formula of a compound is made by writing the proper symbols in juxtaposition, so that NO means a compound of nitrogen and oxygen, HI a compound of hydrogen and iodine, and so on. When two elements form more than one compound, these are distinguished by subscript numerals, as in the examples PCl_3 and PCl_5. In these substances one atom of phosphorus unites with three and five atoms of chlorine respectively. In every case the symbol of an element means one atom of the element, and therefore that relative quantity of it which is indicated by its atomic weight. In water, H_2O, two atoms of hydrogen weighing two units combine with one atom of oxygen weighing 16 units; and thus the formula tells us in shorthand that the compound contains two parts of one element to 16 of the other. No matter how complex a formula may be, this simple rule invariably applies, and by its means the composition of the substance represented can be calculated. The symbols, moreover, can be combined into equations, from which we may compute the outcome of a given chemical

process. This subject, however, is much too abstruse for discussion here. Its details are developed logically from the atomic theory.

To the philosophers who preceded Dalton an atom was the smallest particle of any substance which could possibly exist. Thus water might be subdivided and subdivided until, in theory, a limit was attained, and an atom of water was the result. By chemical means a new order of divisibility had now to be recognized, and the supposed "atom" of water was itself found to be complex and separable into still smaller particles of oxygen and hydrogen. The latter are the atoms of the chemist; the former clusters of atoms are known as *molecules*. This distinction was not developed immediately; its full recognition came slowly, and it derived its importance from certain laws relative to gases which were discovered, partly by Boyle, partly by Gay Lussac and generalized in 1811 by Avogadro. Avogadro's law may be concisely stated as follows: Equal volumes of gases under like conditions of temperature and pressure contain equal numbers of molecules. A molecule is now defined as the smallest particle of any substance which can separately exist; an atom as the smallest particle which can take part in chemical change. Another law, discovered by Dulong and Petit in 1819, was also highly important, for it was shown that the specific heat of an element was inversely proportional to its atomic weight. In other words, the elementary atoms have all the same capacity for heat, and this rule gave us an important check in ascertaining the true weights of the atoms. The law of Avogadro and the law of Dulong and Petit were brought together by Cannizzaro in 1858, and the system of atomic weights and chemical formulæ now in use, which differ in certain essential particulars from those that were first adopted, was the result of the combination.

In the early days of scientific chemistry the science was divided into two great sections, organic and inorganic, the one dealing with animal and vegetable products, the products of life, and the latter with substances derived from the mineral kingdom. Inorganic chemistry, the chemistry of the metals, the earths, the commoner oxides, bases and salts, was for the time being the simpler, and during the first half of the 19th century it received the lion's share of attention. At first it was supposed that the two fields of research were absolutely distinct, and that no organic compound could be derived by artificial means from inorganic sources. This belief was overthrown by Woehler, in 1827, who showed that urea, an organic body, was easily prepared from inorganic ammonium cyanate, and since then a vast number of organic syntheses have been effected. Curiously enough, urea and ammonium cyanate, although very different substances, have the same percentage composition, containing the same elements in exactly the same proportions. Later it was found that *isomerism*, as this semi-identity is called, was exceedingly common, and here was a noteworthy phenomenon which called for explanation. Different molecules could be constructed from the same set of atoms, and the simplest interpretation of the fact was that the latter were differently arranged. Out of the same bricks different houses may be erected. The conception of *chemical structure*, therefore, came into being. What is the arrangement or grouping of the atoms within any given molecule?

The earlier attempts at the solution of this problem have now only historical interest, and their consideration is of value to professional students of chemistry alone. If we were to trace the successive stages we should find evidence of a systematic growth in chemical theory; but definiteness was hardly possible until after Cannizzaro had established the true system of atomic weights, and formulæ had been adjusted in accordance with them. Between 1850 and 1860, however, a new property of the atoms began to be recognized, and this, taken in connection with the formulæ based on Avogadro's law, was the key to the problem. The theory of *valence*, which is the expression of the newly-discovered property, is as follows: Every atom, as regards its union with other atoms, has a certain atom-fixing power, which is known as its *valency*, or *valence*.

Let us take hydrogen as our standard of reference and consider some of its simplest compounds. In HCl, hydrochloric acid, one atom of hydrogen is united to one of chlorine. So also we have HBr, and HI, KCl and NaCl, AgBr, etc. These elementary atoms, which combine only in the ratio of one to one, at least to form permanent compounds, are *univalent*, that is, their power of fixing or uniting with other atoms is unity. In water, on the other hand, H_2O, a single oxygen atom holds two of hydrogen in combination, and so oxygen is called a *bivalent* element. In H_2S, $CaCl_2$, ZnI_2, we have illustrations of still other compounds in which a bivalent atom is united with two of the univalent type. Nitrogen, phosphorus, arsenic, aluminum and some other elements go still farther, and are *trivalent*, so that the compounds formed by them have such formulæ as NH_3, PH_3, AsH_3, $AlCl_3$ and so on. Carbon, a *quadrivalent* substance, forms normally compounds of still more complex type, such as CH_4, CCl_4, or, when it unites with two *dyad* or bivalent atoms, CO_2 and CS_2. For brevity the valency of the various elementary atoms may be indicated by speaking of them as *monads*, *dyads*, *triads*, *tetrads*, etc. The rare metal vanadium is a *pentad*, having a valency of five, and *sexivalent* tungsten is a *hexad*. In many cases valency seems to be a variable property of the atom, as, for example, when we consider the two chlorides of phosphorus, PCl_3 and PCl_5. In cases like these the higher figure may be taken as showing the maximum atom-fixing power of the element, a power which is only partially exercised in the lower compounds.

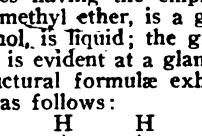
In the theory as thus stated there is no mere speculation; it is a statement of definitely observed facts. It tells us that the atoms unite, not arbitrarily, but in accordance with certain rules; and these help us in our comprehension of known compounds and the discovery of new ones. Indeed, an enormous advance in chemical discovery followed the application of these principles: an advance not only of scientific importance, but of economic and commercial value also. It was in the domain of organic chemistry that the growth became most immediately evident, and to this branch of the science we may now turn our attention. It is here that we find the best illustrations of what is

meant by chemical constitution or structure, and the best examples of isomerism.

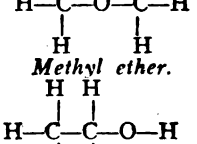
It has already been pointed out that organic chemistry in its beginnings dealt with animal and vegetable substances, the products of living organisms. Other artificial bodies, derived from these, were also included in its territory. All organic compounds were characterized by the presence in them of carbon, this element being ordinarily combined with hydrogen, oxygen, nitrogen, or all three, and sometimes with other elements also. Organic chemistry, as its domain was enlarged, in time received a new definition, and to-day the term broadly signifies *the chemistry of carbon compounds.* It is true that some compounds, such as the metallic carbonates, are more conveniently described as inorganic in character; but these minor exceptions affect the definition but slightly.

At first sight the almost innumerable organic substances appear to be hopelessly complex, and some, indeed, such as albumen, are so; but a closer inspection reveals order among them, and, in general, an ultimate simplicity. Their great number is due to the fundamental properties of the carbon atom, which, being quadrivalent, can unite with four other atoms simultaneously; and which, moreover, may combine with other atoms of its own kind to form rings or chains that serve as nuclei for the development of long series of substances. Most of the latter are derived from *hydrocarbons,* compounds of carbon and hydrogen, and these are exceedingly numerous. Marsh gas or methane, CH_4, contains the largest proportion of hydrogen, and is the type upon which the quadrivalency of carbon is predicated; it is, furthermore, the first member of a series of hydrocarbons, CH_4, C_2H_6, C_3H_8, and so on up to $C_{35}H_{72}$, and perhaps even farther. In this series each compound contains one atom of carbon and two of hydrogen more than the hydrocarbon preceding it, and this regular difference establishes what is known as an *homologous* series. Nearly all organic substances can be arranged in series of this kind, so that the chemist is able to master a great number of details by a single effort of the memory. Moreover, the members of each homologous series vary regularly, step by step, in their physical properties. Thus CH_4 is a gas, C_2H_6 a heavier gas, C_5H_{12} a volatile liquid, the following terms are liquids which grow less and less volatile, while above $C_{16}H_{34}$ the hydrocarbons are waxy solids. Ordinary paraffin is a mixture of these higher hydrocarbons, and the whole group, therefore, is known as the paraffin series. Common petroleum consists chiefly of its liquid members. From these hydrocarbons, with oxygen, a parallel series of *alcohols* is derived: such as CH_4O, methyl or wood alcohol, C_2H_6O, ethyl or ordinary alcohol, $C_5H_{12}O$, amyl alcohol or fusel oil, etc. By further oxidation the alcohols yield a set of acids, among which acetic acid, the acid of vinegar, is the one most familiarly known. This single family of hydrocarbons is the key to thousands of other substances which are directly producible from them. Some of these products illustrate very simply a mode of derivation which is known as *substitution,* as when, from CH_4, hydrogen atoms may be successively withdrawn and replaced by univalent atoms of chlorine. Thus we get the following compounds: CH_4, CH_3Cl, CH_2Cl_2, $CHCl_3$, and finally CCl_4; the fourth one being the familiar body chloroform. So also acetic acid, $C_2H_4O_2$, by substitution with chlorine, gives $C_2H_3ClO_2$, $C_2H_2Cl_2O_2$, and $C_2HCl_3O_2$; but here the process stops and cannot be carried further. The one remaining atom of hydrogen in acetic acid is differently combined from the others, and here we begin to see the sort of evidence by which differences of chemical structure may be determined. When we study great numbers of organic compounds, especially with regard to their possibilities of chemical change, we find that certain combined atoms behave differently from other combined atoms of like kind. We also discover groups of atoms which can be shifted collectively from compound to compound; clusters which act almost like elements and are perfectly definite in their nature. The group NH_4 is so much like a metal in its compounds that it is given a distinct name, *ammonium,* and is conventionally treated as if it were really a metallic body. CN, cyanogen, resembles chlorine in some of its relations, and such groups as CH_3, methyl, and C_2H_5, ethyl, are encountered at every turn. They do not exist separately, but only in combination, and are known as *compound radicles.* Every such radicle has valency, and this is essentially residual in its nature. Thus in methyl, CH_3, three of the four units of affinity belonging to the carbon atom are satisfied by hydrogen, leaving one unit unemployed. Methyl, therefore, is a univalent radicle, and acts almost as if it were an independent element.

The chemical formulæ which we have so far considered belong to the class known as *empirical formulæ;* they give the number and kind of atoms in a molecule, but tell nothing as to their arrangement or mode of union. With the conception of valency and a knowledge of radicles we are now prepared to construct *rational* or *constitutional* formulæ, and from these it is possible to infer what sort of changes a given molecule can undergo, and to understand wherein isomeric bodies differ. For example, there are two bodies having the empirical formulæ C_2H_6O; one, methyl ether, is a gas; the other, common alcohol, is liquid; the great difference between them is evident at a glance. Their rational or structural formulæ exhibit the cause of difference as follows:



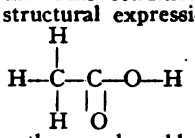
Methyl ether.



Ethyl alcohol.

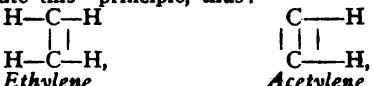
In the first, two methyl groups appear united by an atom of oxygen; in the other, the carbon atoms are directly combined, and the bivalent oxygen connects carbon and hydrogen. The lines which connect the symbols represent units of valency, and the groups CH_3 in one case and C_2H_5 in the other stand for well-known radicles. For further illustration we may recur to the case of acetic acid, in which, as we have seen, three hydrogen atoms behave differently

from the fourth. This condition is shown in the following structural expression:



Here we see the three replaceable atoms directly connected with carbon, while the fourth is linked to oxygen; the latter element also being combined in two ways. The known facts are clearly and simply presented to the eye by a convenient symbolism, a method of formulation which has been of immense value as a guide to practical research. In order to succeed, an experiment upon any of these compounds must be in accord with the facts of molecular structure, for the latter indicate limitations which cannot be disregarded.

In two of the foregoing formulæ the linking of carbon with carbon is clearly indicated, but only by single units of valency, or *bonds* as they are sometimes called. In other cases, however, more complex unions occur, and double or triple linkages are common. The formulæ for two hydrocarbons may be cited to illustrate this principle, thus:



Ethylene *Acetylene*

The second of these bodies is now widely known as an illuminating gas. Each compound is the starting point of an homologous series, exactly as with the paraffins; but the ethylene series exhibits a striking peculiarity. If we add to ethylene successive CH_2 groups, which characterize chemical homology, we get a sequence represented by such formulæ as C_3H_4, C_4H_6, C_5H_8, and so on indefinitely. In all of these compounds the ratio between carbon and hydrogen is the same, and their percentage composition is identical; such a series is called *polymeric*. The different members of the series, however, yield different derivatives, and they are further distinguished from one another by their *molecular weights*, the weight of the molecule being the sum of the weights of the atoms contained in it. These molecular weights can be directly measured by ascertaining the actual weight of definite bulks of the several substances in the condition of gas or vapor. According to Avogadro's law, equal volumes of gases contain equal numbers of molecules; if, therefore, a litre of one gas is twice as heavy as a litre of another, the weight of its molecule must be double that of the latter. By experiment, then, we can determine the relative weights of molecules, and so discover whether a compound is formed from a larger or smaller group of atoms.

One other class of organic substances demands attention here, the so-called *aromatic bodies*, which start from the hydrocarbon C_6H_6, benzene. In the compounds previously considered the carbon atoms are united in a chain-like manner, but in benzene there is good reason to assume that they form something like a ring. Around this ring of carbon atoms the hydrogen atoms are grouped, and by successively replacing them with other atoms or radicles, a myriad of substances may be generated. The details of this theory, which was put forth by Kekulé in 1866, are too abstruse for full development here, but its influence upon chemical research and chemical industry has been overwhelming. From benzene, which is a product of coal-tar, aniline is produced; and the derivatives of aniline give us a perfect rainbow of artificial dyes. To benzene, other hydrocarbons are closely related, and their derivatives are often curiously interesting. Among them we have artificial indigo and artificial alizarin, the latter being the coloring principle of madder. Both compounds are identical with the natural substances, and both are important commercial products. Medicines, like saccharin, antipyrin, acetanilid and phenacetin; perfumes, like musk and violet; and flavoring substances, such as vanillin, are now prepared by synthesis from the hydrocabons of coal-tar, and thousands of workmen find employment in the new industries which are based upon these processes. The investigations which created these new sources of wealth have been in great part guided by theoretical considerations, and at the very foundation of all this work we find the conception of chemical structure, and Kekulé's interpretation of the constitution of benzene. The atomic groupings represented by the structural or rational formulæ are not visionary and their study has led to the greater material well-being of mankind.

It must not be supposed that the rational formulæ represent the arrangement of the atoms in space, for that is not their purpose. It is not likely that the atoms of a molecule all lie in one plane, and yet these formulæ suggest no other mode of grouping. The tridimensional structure of molecules is, generally speaking, almost entirely unknown; and yet, in certain cases, there are clues to a partial solution of the problem. Various organic substances have optical properties which are easiest explained by assuming that the atom of carbon is essentially a tetrahedron in form, and that its four valencies are forces exerted from the centre toward the four solid angles of the body. By means of this hypothesis many curious facts are interpreted and many new discoveries have been made. Formulæ based upon the tetrahedral carbon atom are called *stereochemical* formulæ, and the study of their space relations is named *stereochemistry*. This subject is quite modern and does not admit of detailed discussion here.

That the elements are connected with one another by various relationships is a fact which was early recognized; they were therefore soon classified into groups according to their likenesses. Thus chlorine, bromine and iodine are closely allied and form strikingly similar compounds; lithium, sodium and potassium resemble one another very clearly, and so too do the metals, calcium, strontium and barium. Such a grouping was of great service in classifying many chemical facts, and in due time it was seen to be related to the property of valency. A general law connecting all the elements was, however, not discovered until the decade ending in 1870, during which time three investigators, Newlands, Mendeléef and Lothar Meyer, working independently, developed the *periodic system*. Upon arranging the elements in the order of their atomic weights, a regular periodic variation in their properties appeared, and the fullest interpretation of it was due to Mendeléef. The nature of his work may be partly shown as follows:

Beginning with lithium and arranging the elements in the order above indicated, a table of the following form can be constructed, although only three lines of it are given here:

I.	II.	III.	IV.	V.	VI.	VII.	VIII.
Li.	Gl.	B.	C.	N.	O.	F.	Ne.
7.	9.	11.	12.	14.	16.	19.	20.
Na.	Mg.	Al.	Si.	P.	S.	Cl.	A.
23.	24.	27.	28.	31.	32.	35.5	39.9
K.	Ca.	—	Ti.	V.	Cr.	Mn.	etc.
39.1	40.	—	48.	51.	52.	55.	

Under the symbol of each element its atomic weight is written, rounded-off, in some cases, for convenience. Let us now consider the first line. Lithium, which begins the scheme, is univalent, glucinum bivalent and carbon quadrivalent, a regular increase in valency. Nitrogen is in its stablest compounds trivalent, oxygen bivalent and fluorine univalent; thus showing a steady decrease. Neon, which was not known in Mendeleéf's time, and argon, which falls just below it, are elements of *no* valency, and these form no compounds. These elements, with their regular rise in valency to carbon and fall to neon, form a single period. In the next line, beginning with sodium (Na), the process is repeated; and this happens again in the third line; so that all of the elements in the same vertical column are alike in valency and intimately related in their properties and their compounds. Regular step-by-step variation horizontally, and likewise vertically, characterizes the table, which may, with certain qualifications, be extended so as to include all the elements known.

At the third place in the third line of the table, as given above, a blank appears. This place, when Mendeleéf developed his *periodic law,* was occupied by no known element; and in the fourth period of the completed scheme two similar gaps occurred. These indicated unknown elements, and Mendeleéf, from the properties of the adjacent elements, predicted what their properties should be. Since then the prediction has been verified; and three new metals, having all the properties which Mendeleéf foresaw, fill the vacant places. They are scandium, gallium and germanium. The connection between the elements was more intimate than anyone had supposed, so much so that the unknown could be accurately prophesied. All physical properties appear to rise and fall from element to element in this regular periodic way; and we can now see what sort of elements are likely to be discovered in the future, and where they will stand in the tabular arrangement. The properties of an atom, thermal, electrical, optical, etc., seem to be in great measure dependent upon its weight. The distinctly chemical property of the atom, its valency, may be related to its form, as stereochemical evidence would seem to indicate; but here we have few facts to go upon and speculation would be premature.

The wonderful regularities of the periodic law, with its verified predictions, lead us at once to reiterate the old question as to the ultimate nature of matter. Is it really various in kind, or is it at bottom only one? Are the elements, in the last analysis, elementary? To such questions no final answer can yet be given, but they cannot be silenced; and one of the most marvelous discoveries of science has some bearing upon the problem.

When a beam of white light passes through a glass prism, it is broken up into a bundle of rays which give to the eye the so-called seven primary colors. If this phenomenon be observed through the form of instrument called a *spectroscope,* a continuous band of color is seen ranging from red at one end to violet at the other. Suppose, now, that instead of examining white light, we repeat the experiment with a colored flame and see what will happen. Sodium compounds, for instance, when introduced into a non-luminous gas flame, give out an intense yellow light; and this, viewed through a spectroscope of low power, yields a *spectrum* consisting of a single, narrow, yellow line. Lithium, under similar conditions, exhibits a red line; barium, a group of several green and yellow lines; and, in short, every substance which is capable of coloring a flame gives a spectrum which is not continuous. Each spectrum is made up of bright, colored lines, with dark spaces between; and every line is absolutely characteristic of its source. Every element, provided it be first heated hot enough to be converted into vapor, yields its own definite spectrum of one or many lines, which can be recognized in a spectroscope. The vapor of iron, as obtained in an electric spark between iron terminals, gives a spectrum containing a multitude of bright lines, and every one of them belongs only to iron. The process by which substances are thus identified is known as *spectrum* analysis; and it was discovered by Bunsen and Kirchhoff more than 50 years ago. Bunsen applied the method to the analysis of the salts contained in a mineral water, and saw lines which belonged to no known element. He was thus led to find two new metals, rubidium and cæsium, and soon afterward, by similar means, other chemists discovered thallium and indium.

Shortly after its invention the spectroscope was turned toward the heavenly bodies, in order to see what tales their light had to tell. It was at once found that they are all composed of matter like that with which we are familiar on the earth, although varying in complexity. The sun was proved to be an intensely heated body, containing a large number of our chemical elements in gaseous form, and the fixed stars were similar in character. The whiter and hotter stars contain comparatively few substances, the colored and cooler stars contain more. The nebulæ, those bodies which represent the first step in the formation of planets and systems, were found to be vast clouds of incandescent gaseous matter, in which hydrogen and helium predominated; chemically, therefore, they were extremely simple. From the simplest nebula to the complexity of our earth there was regular chemical gradation, suggesting that the evolution of the one from the other had been accompanied by an evolution of the so-called elements also. A strong argument in favor of the unity of matter was thus brought to light, even though absolute proof was wanting. The general opinion now is that our elements are really complex, although our present resources are not adequate to decompose them.

Very recently this opinion has been strengthened by a group of remarkable discoveries con-

nected with the rare metals, thorium and uranium. These elements and their compounds were found to emit invisible radiations, or emanations, which affect the photographic plate, and also possess certain measurable electric properties. This trait of *radioactivity*, as it is called, led to the discovery of two or three new metals, which are associated in the mineral kingdom with uranium, and one of these, radium, has the new power to an extraordinary degree. The radiations are of several kinds; and are still the subject of active investigation; but one or two of the conclusions so far reached are pertinent to the present discussion. In the case of radium, the emanation consists of chemically inert gaseous particles which are continually being generated and given off from the parent material. The elements thorium and uranium behave in a similar manner. In short, radium, a metal like barium, is an *unstable element*, and it spontaneously, but very slowly, decomposes, yielding helium as its final product. J. J. Thomson, studying electrified gases, is led to the conclusion that the negative charge resides upon certain *corpuscles*, as he terms them, which are not more than the thousandth part of an atom of hydrogen in magnitude, and which are the same for all substances. Particles smaller than the chemical atom are thus being identified, and so the belief in the actual complexity of the elements is receiving close attention.

Although the principles of valency and the conception of chemical structure are best developed and exemplified in the study of organic compounds, the inorganic side of chemistry is by no means to be neglected. Here we find the simplest illustrations of chemical nomenclature, and some of the greatest fields of industrial activity. Sulphuric acid, soda, bleaching powder and many other inorganic substances are of immense commercial importance; and the processes by which metals are extracted from their ores all fall within this department of chemistry. Information upon these practical subjects will be found elsewhere, under the proper headings, such as IRON; PHOSPHORUS; SALT; SODA; etc.; but a few general notions belong here.

The nomenclature of inorganic chemistry is quite simple. Compounds of two elements are described by giving their names and adding the termination *ide* to part of the second title. For example, copper unites with oxygen to form copper *oxide;* zinc and chlorine give zinc *chloride*, and so on, the names thus expressing the composition of the substances. When multiple proportions appear a numeral prefix is added to the class name, so that we have such combinations as iodine *mono*chloride, ICl, iodine *tri*chloride, ICl_3, and the like. In some cases this mode of nomenclature is varied, as when certain well-defined classes of compounds are to be described. Thus we have the iron compounds $FeCl_2$ and $FeCl_3$ (the symbol Fe from ferrum), which are commonly called *ferrous* and *ferric* chloride respectively. The terminations *ous* and *ic* denote lower and higher stages of union and are used for convenience or euphony when the regular nomenclature might be awkward. Such compounds as PCl_3 and PCl_5 may be named either phosphor*ous* and phosphor*ic* chloride, or phosphorus trichloride and pentachloride, according to preference; but the latter form is the more precise and clear. Any compound of a metal with oxygen, then, is an *oxide;* with chlorine, a *chloride;* with sulphur, a *sulphide*, etc.

Three of the largest and most important classes of compounds are *acids, bases* and *salts.* In order to define these rigorously, some previous knowledge of chemistry is required; but an indication of their character is easily given. The acids, as their name implies, are usually sour in taste, but not invariably so, and the stronger members of the class are violently corrosive and able to dissolve metals. They are most commonly derived from the nonmetallic elements, and several acids may be formed from one of the latter. Here again we have the *ous* and *ic* nomenclature, as in sulphur*ous* acid, H_2SO_3, and sulphur*ic* acid, H_2SO_4; the latter containing the higher proportion of oxygen. From nitrogen we get nitr*ous* and nitr*ic* acids, HNO_2 and HNO_3, and so on with simple descriptive names throughout the long list of these compounds.

The *bases* are the direct opposite of the acids in their properties, and have, when soluble in water, an alkaline or soapy taste. The taste of ordinary kitchen soda is a good example of this peculiarity. Certain vegetable coloring matters are changed in hue by acids and alkalis, the latter name being applied to the stronger soluble bases. Blue litmus, for instance, becomes red in contact with an acid, but an alkali restores its original tint. When acid and base are mingled in proper proportions, they *neutralize* each other, and a *salt* is produced which no longer affects litmus. To illustrate further: Soda is a base, and when it is mixed with sulphuric acid it generates sodium sulph*ate*. With sulphurous acid it yields sodium sulph*ite;* and the two terminations *ate* and *ite* correspond to the other terminations *ous* and *ic*. Nitric acid, with bases, forms nitrates; acetic acid, acetates, etc., the nomenclature being simple and easy. Many of the salts are important commercial articles.

From one point of view an acid is a substance which contains hydrogen replaceable by a metal, and a salt is the compound so produced. Zinc, for instance, dissolves in sulphuric acid to form zinc sulphate, and free, gaseous hydrogen is liberated. An acid, then, contains hydrogen plus something else, and the latter is a distinct radicle in each case which exhibits a definite valency. The subjoined formulæ may help to make this point clear:

Nitric acid.	*Sulphuric acid.*	*Phosphoric acid.*
HNO_3.	H_2SO_4.	H_3PO_4.
Potassium nitrate.	*Potassium sulphate.*	*Potassium phosphate.*
KNO_3.	K_2SO_4.	K_3PO_4.

That is, potassium (symbol K from kalium) replaces hydrogen atom for atom; and the radicles, NO_3, SO_4 and PO_4 are univalent, bivalent and trivalent respectively. A knowledge of these simple principles enables the chemist to classify the facts in his mind, and to write numberless formulæ without overloading his memory with details. Learning these principles is like learning a language, only the grammar is easy of acquisition. Fluency in its use can only be gained by practice.

Between allied departments of science no sharp dividing line can be drawn, and this is

peculiarly true with respect to chemistry and physics. The two sciences merge one into the other by imperceptible gradations, and neither can be fully understood separately. Physics treats primarily of the different forms of energy, light, heat, electricity, mechanical force, etc., and all of these appear in the phenomena of chemical change. Furthermore, chemical substances are described in physical terms, and are identified by physical properties such as weight, color, specific heat, melting point, boiling point, electrical conductivity and the like. Considerations of this kind have received much attention during recent years, more than ever before; and so a great department of knowledge has been developed, known as *physical chemistry*. Avogadro's law, the periodic law and the revelations of the spectroscope all fall partly within this field, but other important portions of it deserve some notice here.

Between chemical change and heat the relation is exceedingly intimate. No chemical change takes place without either the liberation or the absorption of heat, and every one is in some measure dependent upon temperature. At very low temperatures, like the temperature of liquid air, all chemical action ceases, and the most oppositely energetic substances lie side by side indifferent to one another. At very high temperatures all unions are broken up, and here again the chemical forces cease to be operative. Most of the changes which we observe are effected at ordinary temperatures, and a slight warming may arouse an apparently inert mixture to chemical activity. The application of heat, then, may either instigate or prevent chemical union, according to circumstances.

As a general rule, with some apparent exceptions, every chemical union develops heat and every decomposition absorbs it; and the study of these relations has received the special name of *thermochemistry*. Furthermore, every chemical change is attended by its own special, definite quantity of heat, and these quantities vary from substance to substance. Hydrogen, burning, that is, combining with oxygen, gives out the largest amount of heat of any substance known; carbon yields much less, phosphorus or sulphur less still, weight for weight being consumed. For such reasons the heat value of any fuel depends upon its chemical composition, and hence careful analyses of coal, which is a variable mixture containing chiefly carbon and hydrocarbons, have great practical importance. From the composition of a coal its *calorific value* may be calculated, although a direct experimental measurement of it is to be preferred. In general laws, however, thermochemistry is still rather deficient, and its larger meanings are yet to be discovered.

Like heat, radiant energy, the energy of light, may cause either chemical union or chemical decomposition. Hydrogen and chlorine, mingled in cold and darkness, do not readily unite, but upon sudden exposure to strong sunlight they combine with explosive violence. On the other hand, silver salts, under suitable conditions, are broken up by light, and upon this fact the art of photography is founded. The photographic film is a laboratory in which light is the chemist. We have already seen, in considering spectrum analysis, that every substance, when intensely heated in the form of gas or vapor, emits light which is peculiar to itself; but there are still other relations between matter and light that have chemical importance. Color is merely the capacity for selecting or absorbing certain rays, and rejecting or transmitting others; and this is often a characteristic distinction between various classes of compounds. For example, salts of cobalt are commonly red, of nickel green, of copper blue or green, and so on. Many of the optical properties of substances seem to depend upon their chemical composition, and in one set of phenomena this fact has economic importance. Certain bodies have the power of twisting or rotating a ray of polarized light, and among carbon compounds this property is directly connected with stereochemical structure. Sugar is one of these optically *active* compounds, and by measuring the amount of rotation which a sample can produce its degree of purity may be determined. This process is practically applied in all sugar refineries for estimating the value of raw sugars or syrups, and also in assessing customs duties. The polariscope used for such purposes is often called a saccharimeter.

Of late years chemistry has been greatly developed upon its electrical side, both theoretically and practically. Electricity may be generated by chemical change, and this happens in all forms of the galvanic battery. For many years, previous to the perfecting of the dynamo, batteries of that class supplied all the electrical power that had any industrial significance. Electricity may also produce chemical change, and it is especially effective in bringing about decompositions. Indeed, many thinkers have sought to identify chemical attraction or affinity with electricity, and even the property of valency is commonly ascribed to electrical charges carried by the atoms.

From a purely chemical point of view, probably the most important electrical phenomena are those of *electrolysis*. When a current of electricity passes through a compound solution, the latter undergoes decomposition, and the dissolved substance, acid, base, or salt, is separated into two parts which move with unequal velocities in opposite directions. The conducting liquid is called an *electrolyte*, and the separated parts, or rather particles, of the compound in solution are termed its *ions*. One ion is positively, the other negatively, electrified, and hence they tend to accumulate around the opposite poles. Under suitable conditions the separation can be made permanent, and this fact is the basis of all our processes in electrometallurgy. From solutions of gold, silver, copper, nickel, etc., the metal is electrically set free, to be deposited upon properly arranged surfaces. Electroplating and electrotyping are operations of this kind. In the electric furnace, however, the electricity acts as a source of heat, and the latter is the effective decomposing agent. In manufacturing chemical preparations many electrolytic processes are now employed. In liquids which do not conduct a current electrolysis does not take place.

Suppose, now, we employ several precisely similar currents to effect a variety of electrolytic changes. Let one current liberate hydrogen from water, another deposit silver, another copper, and so on. Then, upon measuring the quantities of the different substances which have been set free, we shall find them to be exactly proportional to their

chemical equivalents, an equivalent being the ratio between the atomic weight of an element and its valency. For univalent elements the atomic weights and equivalents are identical, for bivalent elements the equivalent is half the atomic weight, and so on through the list. If, then, one gram of hydrogen is liberated, the same current in the same time will deposit 107.1 grams of univalent silver, or one-half of 63.1 grams of bivalent copper, etc. This fundamental proposition of electrolysis is known as Faraday's law. Furthermore, the separated ions all carry equal electrical charges per unit of valency, 96,500 coulombs for a univalent ion, and twice that for a bivalent ion. The relation between electrical and chemical phenomena is of the very closest kind, and Faraday's law is absolutely general.

When two or more substances act upon one another chemically, the entire process is termed a *reaction.* Very many of the reactions which are observed in the laboratory take place between bodies in solution, and hence the study of solutions has received and is still receiving a great deal of attention. No complete theory of solutions has so far been developed; why one substance should dissolve easily in water, another slightly, and a third not at all, remains unexplained; but some generalizations have been reached, and these are of the most suggestive character. Some of the phenomena are electrolytic in their nature, and others go to prove a remarkable parallelism between bodies in solution and bodies in the gaseous condition.

In Avogadro's law the volume of a gas is defined by conditions of temperature and pressure, and equal numbers of molecules occupy equal spaces. The power of exerting pressure is one of the distinct properties possessed by all gases, and this is a consequence of the fact that the molecules are in rapid and continuous motion. Substances in solution are also found to exert pressure, and the latter can be measured by various means. The pressure is proportional to the strength of the solution, and although it is not easily detected, it is often very great. The movement of the sap in a plant is due to the *osmotic pressure* of the dissolved substances that it contains. In 1887 Van t'Hoff, studying these phenomena, deduced from them the simple law that equal volumes of solutions, at equal osmotic pressures, contain equal numbers of molecules, and Avogadro's law was directly paralleled. A body in solution and a gas obey precisely similar laws. We have already seen that from the actual weight of a gas its molecular weight can be determined. Now, from the behavior of substances in solution their molecular weights can also be ascertained. A saline solution does not freeze so easily as pure water, and its boiling point is higher; the depression in one case and the elevation in the other being proportional to the molecular weight of the dissolved substance. These facts are directly connected with Van t'Hoff's generalization, and they are now of almost daily application in scientific research. The actual measurement of molecular weights has been enormously extended by means of the new laws.

Both gases and solutions, however, sometimes exhibit apparent anomalies. Certain compounds, when vaporized, seem not to agree with Avogadro's law, and such facts require explanation. The seemingly anomalous substances, as such, do not exist in the state of vapor, but are split up, or *dissociated,* into other things. For example, ammonium chloride, NH_4Cl, above a certain temperature, is decomposed into a mixture of two gases, hydrochloric acid and ammonia, $NH_3 + HCl$, which, on cooling, reunite and reproduce the original compound. Twice as much vapor as is required by theory, and specifically half as heavy, is produced by this transformation, which is but one of a large class, all well understood.

In the case of solutions it was found that many compounds, especially the acids, bases and metallic salts, caused a lowering of the freezing point that was twice as great as should be expected. Here again a splitting up of molecules, a true dissociation, exactly like that observed in gases, had occurred. Furthermore, the anomalous compounds were all electrolytes; that is, their solutions conducted electricity and were electrolytically decomposed; while normal substances, like sugar, were not. Solutions, then, were to be divided into two classes, differing electrically, and also dissimilar in their relations to Van t'Hoff's law. The explanation of these differences is given by Arrhenius in his theory of *electrolytic dissociation.*

As interpreted by this theory, an electrolyte, when dissolved, is dissociated into its *ions,* partially in a strong solution, and entirely in one which is infinitely dilute; a statement which leads to some remarkable conclusions. For instance, the ions of common salt, sodium chloride, are atoms of sodium and chlorine. In a dilute solution the salt itself ceases to exist as such, while atoms of sodium and of chlorine wander about, chemically separated, but still in equilibrium with each other. Sodium sulphate may be regarded as made up of two parts, sodium ions and ions of an acid radicle, SO_4, and these are severed apart during solution to move about independently. According to this view electrolysis is not primarily a decomposition of the salt: it is rather a sorting out of the already uncombined ions, which receive different electrical charges and concentrate separately at the two electrical poles. Some ions are single atoms, others are more or less complicated groups such as CO_3, SO_4, NO_3, PO_4, etc., which cannot be, or at least have not been, independently isolated.

In the study of chemical reactions the ionic theory of Arrhenius has been fruitfully applied. By means of it we are now able to better discriminate between acids and bases, and to interpret more rationally the phenomena of neutralization. Acids are all characterized by the presence in their solutions of hydrogen ions, single atoms with a univalent radicle, two atoms for each bivalent radicle, etc. Thus in hydrochloric acid the ions are H and Cl; in sulphuric acid 2H and SO_4, and in phosphoric acid 3H and PO_4. In bases, on the other hand, ions of *hydroxyl* exist, and this is a radicle of the formula HO, in which the bivalent oxygen is only half combined. Caustic soda, NaOH, for example, dissociates in solution into the ions Na and HO; caustic lime, CaO_2H_2, into Ca and 2HO, and so on. When a dissolved base and a dissolved acid are brought together, the H ions of the latter and the HO ions of the former combine to form water, H_2O, and vanish from the reaction. The salt which is produced

is represented by the remaining ions, and as the characteristic features of acid and base are gone, the result is neutral. Nearly all reactions in solution, but not quite all, are reactions between ions rather than between the actual compounds with which we originally began.

In the time of Lavoisier chemistry was hardly more than a minor subdivision of natural philosophy. It was just coming into recognition as a true science, and its votaries were few. Its great development has taken place in little more than a century, and now it touches many other branches of knowledge, affects all departments of industry and gives employment to tens of thousands of men. In every part of it there is intense activity, and discovery follows discovery faster than they can be assimilated. Mineralogy is to all intents and purposes a branch of chemistry, for minerals are classified upon the basis of their chemical composition, and the first step toward the establishment of a new species is its chemical analysis. Physiology is in great part a chemical science; respiration, assimilation and excretion are chemical processes; within the living organism, plant or animal, substances are undergoing transformations which only the chemist can follow or identify. The chemistry of vital processes, *biochemistry,* is almost a science by itself, so large is its field and so varied are the problems with which it has to deal. Medicine is indebted to chemistry for almost a new pharmacopœia, for not only have new remedies been created, but in place of old drugs, crude and bulky, the compact and more elegant active principles are now employed. Anæsthetics, such as ether, chloroform and nitrous oxide; hypnotics like chloral; the remedies derived from coal-tar; and alkaloids like quinine, morphine and cocaine are a few of the contributions with which chemistry has enriched medical practice. Even antiseptic surgery depends upon chemical preparations for its success.

The chemistry of agriculture is separately treated elsewhere, but a word may fairly be said upon the relations between chemical science and the arts. Every manufacturing industry is directly and profoundly affected by the results of chemical research. A century ago probably no manufacturing establishment in the world even thought of maintaining a chemical laboratory; to-day hundreds are in operation for the benefit of the intelligent manufacturer. Coal gas is a chemical product; its by-products are ammonia and coal-tar; and from the latter, as we have already seen, hundreds of useful substances, discovered within the last half century, are prepared. Better and cheaper soap and glass owe their existence to chemical improvements in the making of alkalis; chemical bleaching has replaced the slow action of sunlight and dew; chemical dyestuffs give our modern fabrics nearly all their hues. In metallurgy every metal is extracted from its ores by methods which rest on chemical foundations, and analyses of fuel, flux and product go side by side with the smelting. The cyanide and chlorination processes for gold, the Bessemer process for steel, are good examples of the advance in chemical metallurgy; but before they can be applied the dynamite of the miner, another chemical invention, must have done its work underground. Waste products are made useful, and new applications of old materials are discovered by the chemist; even curiosities like the rare mineral monazite are brought into play. Monazite furnishes the oxides of thorium and cerium, from which the mantles of the Welsbach burners are made. Every year brings its improvements, and chemical patents by the hundred are annually issued to inventors.

The facilities for chemical training have increased side by side with the demand for chemical services, and in every university or technical school chemistry has become a leading study. Even the preparatory schools are now equipped with chemical laboratories, and the science has come to be recognized as an important part of a liberal education. Apart from its practical bearings its disciplinary value is very great, and this consideration is now given due weight by teachers.

One more phase of chemical activity remains to be noticed, the organization of chemical societies. Of the larger national organizations the English society is the oldest, the French next, then comes the German and then the American. The American Chemical Society now numbers over 7,000 members and has nearly 50 local sections in continuous operation. In its three journals it publishes over 7,000 pages each year. There are also many smaller organizations devoted to chemistry, and some to special subdivisions of it, such as electro-chemistry. Applied science is represented by the Society for Chemical Industry, an Anglo-American association of great strength.

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F. W. CLARKE,
Chemist for United States Geological Survey.

CHEMISTRY, Progress of. The progress of chemistry has been so disturbed by the European War that it is doubtful if the inventions which necessity has compelled have made up for the deficiency in discoveries for the general welfare and in pure science. In the midst of strife there is but little interchange of communication, so that the work of to-day, done in secret in response to the needs of warring nations, is not yet generally known.

In pure science the tendency has been to remove the dividing line between physics and chemistry and to bring the latter over to a mathematical basis. The problems of physical chemistry, which cover the middle ground between the two sciences, have to do rather with how things happen than with what happens, and it is fair to say that for the past 15 years chemists have set themselves to this task far more

assiduously than heretofore. In considering a reaction, the modern chemist endeavors to compute, as far as possible, the free energy available in order to determine not only what takes place, but also the reason why.

Another subject which has had the attention of many workers of late is colloid chemistry. This has to do with uncrystalline bodies which divide themselves into very minute particles, much larger than molecules, and yet small enough to be kept in constant motion by the bombardment of surrounding molecules. The more finely divided a substance is the greater is the proportion of the surface of its particles to their volume, and, as every surface has its own peculiar qualities in regard to what may be spread out upon it, many phenomena are met with that do not take place in a non-colloidal condition. Inasmuch as all body juices are colloidal in their nature, this study has thrown a great deal of light upon problems of physiology.

Electrochemistry (q.v.) has shown marked advances. The high temperature of the electric arc has provided the means, not only for the fixation of nitrogen in the first instance, but for the combination of elements otherwise inert toward each other. It has made possible the reduction of many rare metals from their ores, thus bringing them into use. The electrolytic refining of copper and the electric steel furnace are products of electrochemical research, as is the aluminum industry.

In applied chemistry we find research active but industry still unwilling, in many cases, to "let in the theorist." On the other hand, chemical control of works and processes of manufacture is growing apace. This and the results of research are the most evident indications of the progress of the science to those unfamiliar with chemical processes. Much has been said of the "scientific management" of men in devising economies of work in manufacturing processes, but much has also been done in the scientific management of materials in relation to their chemical reactions during the processes of industry. We shall address ourselves principally to applied chemistry and note some of the industries in which the hand of the chemist may be traced and make comment upon what he has done as well as upon the outlook for the future.

Power.— This is the first great requirement in nearly all manufacture and is of vast importance in electrochemical industry (q.v.). Water power is not used to its full extent. In the United States the conservation statutes which withhold it under fear of private control or monopoly have had an important bearing on this. A promising method of converting water into steam is by burning coal in the form of a very fine powder. This ensures complete combustion, avoids smoke and promises marked economy. The burning of coal powder is in general use in the Portland cement industry to obtain the high temperatures needed in the operation. It is necessary that the coal be milled as it is fed into the fire, as in a powdered condition it is easily exploded. A problem yet to be solved is a way to avoid the damage done to boiler plates by the high temperatures obtained in combustion. As soon as this is overcome, the steaming power of coal will be materially increased.

Gas-engines are competing with those steam driven, but they are still more expensive to install and more difficult to operate. On the other hand, coal gas, by which these engines are propelled, is increasing in use for power. The development of by-product ovens for making coke for the manufacture of pig iron, in the place of the wasteful beehive coke ovens, has provided a new source of coal gas in large quantity. Another prospective cheapening of gas to the consumer is that municipalities may learn the expensiveness of demanding candle power in the place of heat units as the standard of gas furnished by public service corporations. The increased light obtained by the use of mantles of the Welsbach type from gas low in illuminating power and much cheaper to produce should bring this about.

Motor Fuels.— These are all chemical products, and while the needs have not been fully met, the outlook is encouraging. The use of automobiles is increasing faster than is the production of gasoline, so there is a problem to be solved. One way to meet it is by "cracking" petroleum, whereby the more complex, heavier bodies are in effect chemically split down into lighter bodies by means of heat and pressure. There is, however, a limit to the number of times heavy petroleums may be cracked, owing to their tendency to revert to their elemental carbon and hydrogen if the process is carried too far. Heavy trucks are now beginning to use the cheaper kerosene, starting the motors with gasoline or alcohol. What is needed is either a successful kerosene carburetor or an oxidizing agent to prevent the fuel from carbonizing in the cylinders.

The art of making ethyl (grain) alcohol from sawdust and other wood waste, and from the sugar in the waste liquors of sulphite pulp mills has been developed to a qualified commercial success. The leading raw material for this purpose is molasses, which is a waste product of the sugar industry of the United States and the West Indies. Vast quantities are produced from this source for industrial use today. Frost-damaged corn, of which nearly every year there is considerable, is also used. If the raw material is starch as in corn or potatoes, or if cellulose as in sawdust, these products are first reduced to sugars and then fermented to alcohol and carbonic acid gas. The alcohol is then distilled off. Alcohol more or less mixed with petroleum bids fair to become important as motor fuel in the United States.

With the growth of the by-product coke industry there will be a larger production of benzole from coal-tar than the color, explosives, and other industries evidently need, and the excess will be available as motor fuel.

Size of Apparatus.— This has grown, especially in the smelting industry, iron blast furnaces in the United States reaching a capacity of 500 tons daily. On the other hand, chemists have become more than ever alive to the fact that increase in size of apparatus may only be availed of after careful study, because questions of temperature, pressure and, in general, the ways of stuff in the mass, are not to be guessed at. This has taught manufacturers the principle that every new process should be tried out in a small factory before a large plant is built. Many problems of physical chemistry are still unsolved, and the phenomena of chemical

action in the mass differ in surprising measure from laboratory experiments made under different physical conditions.

Iron and Steel.— The greatest contribution to iron manufacture within the past 25 years was made by James Gayley, by bringing air to a stable, low temperature before it enters the blast furnace. A given temperature within the furnace is provided for, but if the water content of the air varies, the operation of the furnace becomes irregular. Now the warmer the air is the more humid it may be. For instance, if one cubic mile of air at maximum humidity at 95 degrees Fahrenheit were cooled to 32 degrees, there would be given off 140,000 tons of water, or 35,000,000,000 gallons. It had always been noticed that blast furnaces worked better in winter than in summer, but the reason was not known. By the Gayley process the air is refrigerated and thus a great part of the water is extracted. The saving amounts to a dollar or more in the cost per ton of pig iron.

The Siemens open-hearth process for making steel has supplanted the Bessemer method in part, because, although the open-hearth process is much slower, it is under far better control and the product is more even and generally better. In many of the largest steel works the conversion from iron to steel is first done in part in Bessemer converters and continued in open-hearth furnaces. This saves a great deal of time. In some of the most modern works steel is made in two steps; first in Bessemer converters, and from these into electric furnaces. The economy of beginning with molten iron from a blast furnace and finishing it as electric steel without once allowing the metal to cool may readily be seen, while the quality compares with that of crucible steel.

For making steels of the best quality and greatest purity the old method of refining in crucibles is still in use although the electric furnace is supplanting it in part. Owing to the amount of electric current required and the short life and heavy expense of carbon electrodes, the process is costly, although less so than it is to produce steel in crucibles.

Steel Alloys.—Very interesting and valuable strides have been made in the production of alloys of other metals with steel. Some have been known for a long time while others are of recent discovery. Nickel, for instance, gives to steel tenacity and ductility; nickel and chromium, hardness; manganese increases tenacity and improves the working qualities; tungsten is added to make self-hardening and other special steels; titanium produces great stiffness, especially in rails; and the presence of no more than one-quarter of 1 per cent of copper in steel sheets is remarkably effective in preventing rust. Certain proportions of tungsten, chromium and molybdenum, in conjunction with special tempering, make the Taylor & White "high speed" tool steels. Vanadium gives great hardness. Silicon makes steel and iron brittle but hard, and a steel low in carbon but high in silicon content has a resistance to electricity four or five times greater than ordinary iron and loses less current when installed in electrical machinery. A very high silicon content makes iron resistant to acids and alkalis.

Sulphuric Acid.— This is the most widely used of all chemical products and touches, at one point or another, a vast number of manufactured articles in daily use. When sulphur is burned out of metallic ores or as elemental sulphur, the compound SO_2 or sulphur dioxide is formed. These choking fumes, familiar to all of us, constitute the anhydride of sulphurous acid, but to produce the anhydride, or body which with water produces sulphuric acid, another atom of oxygen is needed in the molecule. In other words, it is required to change SO_2 to SO_3. The formula for sulphuric acid is H_2SO_4, while that of water is H_2O. The relation, then, of SO_3 to sulphuric acid may be seen in the following equation:

$$SO_3 + H_2O = H_2SO_4$$

Sulphur Trioxide. Water. Sulphuric Acid.

The standard method has been to bring the sulphurous fumes into great leaden chambers and there to effect a union with oxygen by means of oxides of nitrogen, which are ultimately recovered. This must be done in the presence of water so that the resultant acid or "chamber acid" as it is called is weak, and the excess water must be boiled off.

A later method of producing the anhydride of sulphuric acid (SO_3) is accomplished by what is known as catalysis, whereby a foreign body causes a chemical action to take place between others without apparent change in itself. For instance, if the fumes of burning sulphur or sulphur dioxide are brought together with air, which contains one-fifth oxygen, in the presence of platinum sponge, under the proper conditions, then great clouds of sulphuric anhydride or SO_3 (the trioxide) will fall to the floor of the apparatus. This is the principle of the contact process and it is in wide use wherever the anhydride is especially needed. The old chamber process, however, has also been improved, so that it is not clear which process is cheaper to make an acid of 93–95 per cent concentration. Chamber acid is more cheaply produced in the old way than by making SO_3 and then adding dilute acid to it. (No one would think of adding water to SO_3 in practice because the reaction would be too hot and lively for convenience).

A notable change in the industry in the United States within the last few years has been the enforced manufacture of sulphuric acid by copper and zinc smelters in order to get rid of the sulphurous fumes from the roasting of their ores, which vitiated the air for miles around the smelters, ruined vegetation, killed farm crops and are conceeded to be inimical to health. It was made possible by the invention of Dr. Frederick G. Cottrell. He found that by the conduction of high tension electric currents through vapors under proper conditions, suspended bodies were precipitated from the air as the currents pass through them, along with any excess of moisture contained in the air. This saved the day for many copper smelting corporations that were in immediate danger of being compelled by law to shut down, owing to the fumes which they produced. A considerable part of the sulphuric acid produced in the United States is now made from smelter fumes. The Cottrell process has been partially worked out with reference to other problems, such as the smoke nuisance in cities, and with reference to fog at sea. The

method proposed for overcoming fog is to sail an electrically operated small aeroplane, merely large enough to carry the necessary apparatus, attached to the bow of a ship. Then with one pole on the aeroplane and the other at the bow of the ship, the high tension currents would pass between them and the intervening fog should be precipitated. It is interesting to record that Dr. Cottrell turned over all the proceeds from his patents on electrolytic precipitation to be expended for research in the advancement of science.

Nitrogen Compounds.— This has been one of the fields of greatest achievement of late years. Nitrogen, of which four-fifths of the air is composed, is needed in combination for fertilizer, for food, for the manufacture of dyestuffs, explosives, medicines,— in short, nitrogen in combination is needed constantly for a vast number of purposes. Formerly the only source of supply was the great beds of nitrate of soda found in Chile, but not only will these be exhausted within 100 to 150 years at the present rate, but in the event of war, a blockade of the Chilian ports makes the production of explosives impossible. For despite the inexhaustible volume of it all around us, it will not enter into chemical combination except at the temperature of the electric arc or, until lately, under conditions unknown to man. Leguminous plants, such as clover, cowpeas, alfalfa, etc., take up nitrogen from the air and not only use it but enrich the soil with it when they are ploughed under. Other plants do not accomplish this and neither do laboratories or factories to this day, save in a roundabout way. The industry started at Niagara Falls under the invention of an American chemist, Charles S. Bradley. The product proved too expensive to persuade the investors in the enterprise that it was worth while, and the work was discontinued. Then two Norwegians, Birkeland and Eyde, took it up and have developed an enormous industry. With the great water powers of Norway, available to industry, they develop electric currents and produce nitric oxides from the nitrogen and oxygen of the air. These oxides, brought into combination with lime, produce a fertilizer which is sold all over the world. The process calls for vast quantities of power, and in Germany, with the war on and the supplies of nitrate of soda approaching an end, and the ports all closed, and no great water power development available in the country, something had to be done if the war was to continue. Without fixed nitrogen, no explosives may be made. At this point the process of two chemists, Haber, a German, and Le Rossignol, a Frenchman, was used whereby ammonia was produced by causing nitrogen of the air to unite with hydrogen. They knew, as chemists have long known, that if three volumes of hydrogen gas and one volume of nitrogen are enclosed in a vessel and an electric spark is passed through the mixed gases, a little ammonia will be formed. Ammonia is a combination of three atoms of hydrogen with one of nitrogen. Not much ammonia is formed, though, because at that temperature it is not a stable compound and it dissociates into its components, nitrogen and hydrogen. They sent the gases, instead, through tubes under varying conditions of heat and pressure, bringing them into contact with various metals with a view to getting them to act as catalysts. In other words, they were after a contact process. They succeeded with the metals osmium and uranium, and by 1913 there was erected in connection with one of the industrial establishments a $10,000,000 plant which operated successfully. But ammonia gives with water an alkaline reaction, and while incalculably useful in the arts of peace, it will not do to make munitions. So a late discovery of Professor Ostwald was availed of, whereby ammonia, brought together with oxygen, under catalysis, produces nitric acid and water. This solved the problem. Another process to produce ammonia by contact was developed in the research laboratory of the General Chemical Company of New York and turned over to the United States government for war purposes. It is an improvement over the German method. Still another in wide use consists in treating calcium carbide at a high temperature with nitrogen gas, which combines with it and produces what is called calcium cyanamide, $CaCN_2$, a favorite nitrogen fertilizer. Then calcium cyanamide treated with super-heated steam produces calcium carbonate, which is the composition of limestone and ammonia. Prof. John E. Bucher of Providence, R. I., has patented a method whereby steam and powdered coal and soda are brought together in the presence of iron; and as air, which is four-fifths nitrogen, is passed through at a moderately high temperature, sodium cyanide is formed. But this poisonous substance, when treated with steam, goes over into bicarbonate of soda and ammonia.

Soda.— The old standard method of producing soda (sodium carbonate) from salt (sodium chloride) was by the process of Nicholas Leblanc, who in 1789 developed his invention and presented the discovery to his patron the Duke of Orleans, whose domestic physician he was. The Duke provided capital for the start of the industry, but the French Revolution came along and the industry, as is the way with such things in times of disorder, moved over to England where the process is still in operation in some works. It consisted in treating salt with sulphuric acid, producing salt cake (sulphate of sodium) and muriatic (hydrochloric) acid. The salt cake was heated with coal and limestone (calcium carbonate) until the mass had fluxed, when the reaction took place; that is, there was an exchange of acids and bases, the sulphate of sodium becoming the carbonate and the lime becoming the sulphate. We need concern ourselves no further with the details of the process because it is practically obsolete.

In 1861 Ernest Solvay of Brussels patented the so-called Ammonia process, which is that by which the major portion of the soda used to-day is made, although we shall soon note another process that is crowding it wherever there is abundant power for electricity. In the Solvay process, salt (sodium chloride) is treated with ammonium bicarbonate, or successively with ammonia and carbon dioxide, at a low temperature. Sodium bicarbonate and ammonium chloride are formed and the former being nearly insoluble in a solution of the latter, it precipitates out. The mother liquor (of ammonium chloride) is drawn off, treated with caustic lime, which frees the ammonia which is recovered and produces calcium chloride.

By using magnesia instead of lime the chlorine may be saved and the magnesia used continuously. The bicarbonate of soda is changed to the carbonate by heating. Caustic soda is made by treating the carbonate with quicklime.

The still newer method, resulting in caustic soda as the first product, and a very successful one, is the electrolytic process, which is by no means as simple as it looks. Methods differ in detail, but in principle the salt brine is led into an electrolytic cell, through which a current of electricity is passed which splits the sodium from the chlorine, each element approaching its opposite pole. The sodium combines with the water to form caustic soda and the chlorine is collected. A very lively industry is developed at Niagara Falls, N. Y., and elsewhere, under several modifications of this process. See ELECTROCHEMICAL INDUSTRIES.

Chlorine.— The electrolytic production of soda and improved methods of transporting gases in iron containers has facilitated the use of chlorine in bleaching, in chemical manufacture and in the destruction of noxious bacilli in supplies of drinking water. A surprisingly small amount of the gas dissolved in water seems effectively to destroy them. Since the water supply of New York City has been chlorinated, no single case of typhoid fever has been traced to this source. The gas, condensed to a liquid, is shipped in cylinders under pressure and it has replaced the use of bleaching powder in many instances. It was the first German "poison gas" of European warfare.

Flotation.— An improved method of concentrating ores has been found to consist in grinding the rock to a very fine powder and then feeding it into a tank containing water and a slight amount of oil. As bubbles are caused to rise in the water, the metal-bearing particles attach themselves to the bubbles and float to the top, while the lighter gangue of limestone or other rock falls to the bottom. The phenomenon is regarded as due to the fact that the oil wets at once the metallic surfaces and the surfaces of the bubbles, which carry the oil and the metal to the top. The particles of rock, on the contrary, not being wetted by the oil, do not so attach themselves, and so fall to the bottom. By this means a 20 per cent concentrate may be obtained from a 2 or 3 per cent ore. The process has come into very widespread use.

Artificial Precious Stones.— Very small diamonds are produced by heating a piece of iron, as pure as possible, with sugar charcoal in a carbon crucible in an electric arc furnace, according to the discovery of Moissan. Under these conditions the iron melts and dissolves a great deal of carbon. At about 4,000 degrees Centrigrade, when the iron volatilizes in clouds, the crucible is plunged in cold water. The sudden cooling solidifies the outer layer so that the inner core becomes solid at enormous pressure. This separates some of the carbon from the iron and when the latter is dissolved away by means of an acid, a few microscopic diamonds are found, with graphite, in the residue. No large diamond has been produced synthetically. Greater success has been attained in the production of other precious stones. Rubies and white, yellow and blue sapphires are among the principal stones made. They are synthetically correct, consisting of alumina fused with additions of chromium and iron oxides, titanic acid and other materials, according to the content of the stones as found in nature. They cannot be distinguished from natural gems.

Coal-Tar Industry.— At the present time, this industry is in a state of high fever. Tar is the generic name for all that part of coal which does not remain behind as coke, on distillation, and which does not go through the gas pipes into the gasometer. It consists of a large series of bodies, from benzole, which is lighter than water, to pitch. The pitch is used for roofing and very lately an American process has been developed for coking it. The lighter bodies are used for preserving woods, and, with the still lighter ones, as the starting point for a vast variety of chemical products. These include the long list of coal-tar colors, explosives, photographic and pharmaceutical preparations, synthetic perfumery and innumerable other products.

Despite the great use of coal in the United States, the country has not been as large a producer of tar as might be expected, because petroleum water gas has been greatly used in cities, and this produces practically no tar. The coke for the iron industry (to our shame be it said) has been made chiefly in ovens of the so-called beehive type in which everything, all the precious content of the coal except the coke, is wasted. This condition is in process of correction; by-product ovens are rapidly supplanting the beehive type and the amount of available tar is increasing. At present it is estimated that nearly one-half of the coke produced in the United States is still made in beehive ovens. Until the outbreak of the war, the principal use for tar in the United States was for some of the pitch, the other bodies being exported or used to enrich city gas or wasted. In fact, the light oils from nearly all coal tars found their way to Germany, if they were saved at all, for there was the great coal-tar color and product industry of the world. Then came the war, the closing of German ports and general anarchy of trade. Within an area the size of the State of New York a great part of the dye-stuffs, all of a certain kind of medicines, many photographic materials — in fact, the bulk of the coal-tar product industry, was located. But the very same things needed to make dyes, etc., are needed to make munitions. The same raw materials are needed for both. What the color maker wanted the explosives works needed, and the latter were willing to pay any price. This is what gave the by-product coke-oven industry, which was slowly developing in America, its rapid development. The coal-tar industry has since then grown in the United States by leaps and bounds. At the outbreak of the war, there were six factories making dye-stuffs from intermediate products imported from Germany. Now, after less than four years, there are nearly 100 concerns making finished products with the old ones greatly enlarged, and over 40 factories making intermediates. What the future of the industry will be when the demand for the lighter oils of tar for munitions ceases, it is hard to tell. Benzole, it may be recalled, is an excellent fuel for explosion engines and it will probably become a rival to gasoline.

Medicines.— The advances made in physiology in connection with physical chemistry

have enabled intelligent physicians to comprehend the reactions which take place with many medicines, and thus to proceed with greater understanding and — less doses. When the chemical structure and reactions of a body are known it is desirable that it be dispensed in a pure state, and this need has brought about marked improvements in pharmaceutical chemistry. Many synthetic bodies, built up under careful supervision and with knowledge of their structure, have supplanted indefinite decoctions made by extracting all the soluble juices of plants and letting them go as the concentrated extract of something chemically unknown.

Rubber.— Synthetic rubber has been produced by causing certain hydrocarbons to polymerize, which is, in effect, to cause their molecules to join in large groups. But very little has been produced and in view of the improved culture of gum-producing trees and plants, and the better harvesting of the latter, the question is still debatable whether the synthetic product will replace the natural one, economically, as was the case with indigo before the war.

Perfumes.— A growing knowledge of the structure of the molecules of organic compounds has enabled chemists to provide ethers and esters of great olfactory power and by mixing these to obtain odors desired. Musk and other standard perfumes are now produced synthetically in factories. The sense of smell, what olfactory phenomena are, and what their relation to life is, remains unstudied. The mediæval Saracens were far ahead of us in the understanding of this sense.

Sewage.— It has been found that sewage, if aërated or "activated" as it is called, by letting air bubble through tanks containing it, will separate by oxidation into two types of bodies; the sludge, which precipitates and is available as a nitrogen fertilizer, and the effluent, which is a clear solution. By treating the effluent with chlorine, its danger as a carrier of disease is removed and it ceases to pollute the streams into which it flows. The economic treatment of city sewage, so that the recovery and sale of inoffensive sludge as fertilizer pays the cost while the pollution of rivers and harbors is brought to an end, has not yet been generally attained. Of considerable promise is the Miles process whereby sulphur dioxide is mixed with the sewage which reduces all the soaps and fats. With the fats removed by means of a recoverable organic solvent, the sludge is good nitrogen fertilizer. The outlook for its early achievement is favorable.

Paper.— There are certain combinations of carbon and hydrogen that are known as sugars. There are many of them, but they are all alike in that they are made up of carbon atoms strung together as in a chain, with hydrogen and oxygen atoms stuck on along the side of the chain. Now suppose you take a number of these sugar molecules, as the smallest particles imaginable are called, and bunch them together, so that a lot of these units are combined into one big complex one. Then you have a series of resins or gums and starch. This is what chemists call polymerization. Now let us take these resins and by chemical chicanery and tricks cause them to bunch their molecules again, to polymerize, and, if we carry it far enough, we get cellulose. That is, we should if we could. But trees and plants do this with ease; they start with water and carbonic acid gas, from the air, and this they manufacture into sugar, the sugar into starches, gums and other things, and finally into cellulose, of which their cells are made. Cellulose is the framework of cells, and all organic life is made up of it, with juices and sap and solutions of one sort or another wandering around within them. Cotton is nearly pure cellulose. Paper is cellulose; little filaments of it, matted or felted together.

Now the varieties of cellulose and the differences in their structure, both physical and chemical, are beyond the knowledge of to-day. Cotton, as we have already said, is nearly pure cellulose and yet there are 60 different varieties of it listed, and they all differ from each other in the structure of their fibres. So we may say that the art of making paper, which has already entered the list of chemical manufacture, is one that presents innumerable unsolved problems.

The main source of available supply is wood. Mechanical pulp, which is the cheapest, consists in the fibres of soft wood, torn asunder by grinding diagonally the edges of the natural wood with a stone, in the presence of water. Their particles contain a large part of the gums and other substances of the tree which are less stable than cellulose. So they oxidize on long exposure and the process of oxidation, whether it be slow as in this instance or rapid as with fire, is likely to be contagious, and the cellulose is in time changed to oxy-cellulose, which is an amorphous powder with no mechanical qualities whatever. That is why newspaper lacks durability. It also explains why old-fashioned hand-made paper, made of linen rags, is more durable than modern paper, even though it be made of linen, too. The chemical treatment is more severe and drastic in the modern machines than in the old hand beaters, whereby the chemical structure of the cellulose seems to be attacked and thus rendered more susceptible to oxidation.

A better quality of pulp is made by the sulphite process, discovered by a Philadelphia chemist named Tilghman. It consists in treating chips of wood with a solution of calcium bisulphite, with a view to dissolving out by the sulphurous acid which is set free all organic substances except the cellulose. It takes place under heat and pressure. The cellulose fibres of the chips are then bleached and treated with water and strained until they are thoroughly separated from each other. It requires about 20 per cent of sulphite pulp mixed with the mechanical product to make a good quality of newspaper.

A stronger quality of sulphite pulp is provided by the Mitscherlich process in which a weaker acid is used. This points the way to improvements in the art such as the lately developed, so-called Kraft paper, a very strong wrapping paper made of undercooked sulphite pulp. This has developed into what is known as the "sulphate process," which, by its milder chemical treatment of the wood, is finding increased application.

The tendency of research in the preparation of pulp is to conserve the chemical structure of the cellulose and to find new sources of supply, owing to the using up of spruce and other

soft-wood forests for this purpose. The United States consumes from four to five million cords of pulp wood per year, involving the cutting over of several million acres to furnish it. An immense source of supply is available from the lumber industry, which wastes more than half of the cut of timber. Much of this is available for paper under more enlightened methods. Many raw materials for the manufacture of paper have been proposed and in other countries other materials are availed of. Esparto, a grass growing in southern Spain and northern Africa, is used in England and on the Continent. The Japanese use mulberry fibre. Bamboo is also used, although the knots give trouble. Corn stalks, rice and flax straw, cotton stalks and wild bananas have been tested with varying degrees of success. It is also proposed by the dehydration of sugar cane at the plantation to extract the raw sugar in temperate climates and use the cane for making paper, for which it is well adapted. This is now used for fuel in the tropical sugar centres. On the other hand, nothing so economical and convenient as spruce wood has thus far been found for making paper pulp, provided always there is enough of it at hand.

Since all plants that grow are made up of cells, and the walls of cells are cellulose and paper is but matted or felted cellulose fibres, it is impossible to outline the future of the paper industry under chemical control and with abundant research. The waste liquors of sulphite pulp mills, in which one-half the cellulose has been lost, still pollute streams and cause waste. The sugar in the waste liquor may be converted into alcohol and uses are gradually being found for the gummy products that now cause trouble. As soon as it can be made to pay, then waste liquors will be evaporated to dryness and the nuisance avoided.

Drying, mixing, grinding, filtering, heating, refrigeration and distillation and work under pressure as well as in vacuo are problems to which the chemical engineer has addressed himself; and the making of apparatus for these special purposes has become a series of special industries. Just as, considering pure science, we found the line between chemistry and physics fading away, so in industry we find that there is no more a clear dividing line that separates chemistry from engineering.

In conclusion it is fair to say that there has been great advance in the knowledge of how closely chemical processes touch us on every hand. It is needed in the preparation of our food and clothing, in the materials of our houses, in the care of the water we use and in cleaning streets. It is needed in the control of the production of metals and it prepares for us paints, varnishes, paper, ink; indeed nearly everything we use or handle has needed chemical control in the making. Its language is ugly and seems difficult, although it is not so hard to learn as many of us are disposed to think. We need a better understanding of it because through it we may learn to avoid the flagrant waste of the riches of the earth, of which our generation has been guilty. And with a sense of chemistry in our minds all the processes of nature take on a new and added interest.

ELLWOOD HENDRICK.

CHEMISTS AND DRUGGISTS, Laws Relating to. In the United States the terms "apothecaries," "druggists" and "pharmacists" are used more or less indiscriminately to designate those licensed to compound and sell drugs and poisons. In England there is a legal distinction applied to these; apothecaries being constituted the lowest type of the profession with rights of practising, limited to a few classes of cases; chemists and druggists are compelled to pass an examination at the college of pharmacy and receive a license to compound and sell drugs and medicines; pharmacists are obliged to pass a second examination. In the United States the statutes generally require of those wishing to adopt this profession to pass an examination before a State board, or to produce a diploma from a recognized college of pharmacy. There are in addition State and municipal ordinances which state the conditions under which certain drugs or poisons may be sold, prescribing also regulations as to labels on containers of poison, and the entry of such sales in a special book open to public inspection. The certificate or prescription of a physician is required for certain drugs or liquors. Carelessness in compounding a prescription, if it lead to death or serious injury, is considered gross and is a penal offense. In case it result in death, the offense is usually manslaughter.

CHEMITYPE, a term used in engraving to include various relief processes by which a drawing or impression from an engraved plate may be produced in relief to fit it for printing on an ordinary printing press. One of these, devised by C. Pül of Copenhagen in 1843, depends on filling up the lines of the engraved zinc plate with some metal or alloy, and etching away the zinc.

CHEMNITZ, or KEMNITZ, Martin, German Protestant theologian: b. Treuenbrietzen, Brandenburg, 9 Nov. 1522; d. Brunswick, 8 April 1586. He was the son of poor parents; received his education at Magdeburg and Frankfort on the Oder, and in 1544, to obtain the means of continuing his studies at Wittenberg, became a schoolmaster in Wriezen. In 1550 he became librarian to Duke Albert of Prussia. He then wrote his 'Loci Theologici,' a valuable commentary on Melanchthon's system of dogmatics. Being invited to Brunswick, as minister, he attacked the Jesuits in his 'Theologiæ Jesuitarum Præcipua Capita' (1562), and, when the Council of Trent thought itself assailed in this work, he wrote his 'Examen Concilii Tridentini,' a work of great historical value. With Joachim Mörlin he wrote 'Corpus Doctrinæ Prutenicum' (1567). He gradually became attached to the Lutheran doctrines as distinguished from those of Melanchthon, and did much to spread the Lutheran doctrines among the Saxon and Swabian churches. Consult his 'Life' by Lentz, C. G. H. (Gotha 1866); Mumm, R., 'Die Polemik des M. Chemnitz gegen das Konzil von Trent' (Leipzig 1905).

CHEMNITZ, Saxony, town at the base of the Ezrgebirge and at the confluence of the Chemnitz River with three other streams, 51 miles south-southeast of Leipzig. The city consists of an older inner town, almost circular in form, intersected by narrow streets, completely surrounded by modern suburbs.

Among its numerous squares and public places are the Hauptmarkt, which contains the old Rathaus, the Neumarkt; the Königs-Platz; with the church of Saint Peter and the Technical Schools. The city owns its water, gas and electric works, maintains a municipal pawnshop. Its educational institutions include a gymnasium, schools of agriculture, commerce, engineering and the various crafts. There is also a municipal library of over 35,000 volumes. It is the principal manufacturing town of the kingdom — the "Saxon Manchester" its townsfolk call it — its industry consisting in weaving cottons, woolens and silks and in printing calicoes, chiefly for German consumption. It also has large manufactories of carpets, dyestuffs, chemicals, leather, vehicles and beer. It supplies the world with cheap hosiery, and makes mixed fabrics of wool, cotton and jute for the markets of Europe and the United States. It has several extensive machine-factories, producing locomotives and other steam-engines, with machinery for flax and wool-spinning, weaving, and mining industry. Created a free imperial city as early as 1125, Chemnitz suffered much during the Thirty Years' War; but later in the century the introduction of cotton manufacturing revived its prosperity. Its growth during the last 20 years has been phenomenal. Pop. 287,340.

CHEMOSH, kē'mŏsh, the national god of the Moabites, who were on that account called "the people of Chemosh" (Num. xxi, 29; Jer. xlviii, 46). In Judge xi, 24, Chemosh is mentioned as the god of the Ammonites, but the whole narrative here applies to Moab, and not to Ammon. Milcom was the national deity of the Ammonites. The Moabite Stone was erected to commemorate victories achieved by the aid of Chemosh. In the inscription upon it Ashtar-Chemosh is mentioned, apparently a goddess associated with Chemosh. Human sacrifices seem to have been occasionally offered up to Chemosh (2 Kings iii, 26, 27). The worship of Chemosh was introduced among the Hebrews by Solomon, who "built an high place for Chemosh, the abomination of Moab, in the hill that is before Jerusalem" (1 Kings xi, 7). Some have identified Chemosh with the sun, others with Saturn, while still others have regarded him as a war-god. These identifications are valueless. Chemosh doubtless bore the same relation to the Moabites as did Yahwe to the Hebrews.

CHEMOTROPISM, kē-mŏt'rō-pĭsm, orientation (q.v.) by diffusing molecules, as where animals are mechanically attracted to their food by the sense of smell. This is positive chemotropism. Negative chemotropism consists in movements away from some reagent. Odoriferous particles are diffused or radiate from a centre; chemotropism is thus analogous to heliotropism (q.v.). The chemical effects of the diffusing molecules on certain elements of the skin, says Loeb, influence the tension of the muscles, just as the rays of light influence the tension of the muscles on heliotropic animals. Thus maggots of flies are positively chemotropic toward certain chemical substances which are formed, for instance, in decaying meat and cheese. The blow-fly (q.v.) has the same positive chemotropism for these substances as its larva and is accordingly led to the meat. This explains the instinct of the blow-fly and similar insects, which compels them to lay their eggs on the food appropriate for their young, neither experience nor will playing any part in their processes. Chemotropic phenomena also occur in plants, and depend on alterations of growth produced by the exciting substances. Consult Loeb, 'Comparative Physiology of the Brain and Comparative Psychology' (New York 1900).

CHEMULPO, chĕ-mŭl'pō, Korea, town on the western coast at the mouth of the Han River, 25 miles by road west-southwest of the capital, Seoul. It is one of the three treaty ports opened in 1883 to foreign commerce, the volume of which has since steadily advanced, in spite of the drawbacks resulting from the great difference between high and low water here (33 feet), and the want of wharves. The imports attain a value of $7,227,000 in some years; the exports, $1,950,000. The chief imports are cotton and woolen goods, railway machinery, metals, oils, textiles, silk, petroleum and timber; the chief exports are rice, beans, millet, ginseng, wheat, paper and cowhides. The majority of foreigners are Japanese. In 1900 a railroad connection was established with Seoul. Improvements by the Japanese have made the river navigable. Small steamers owned by Japanese run to Seoul in summer, and Chemulpo is connected by telegraph both with China and Japan. At the outbreak of the Russo-Japanese War a Japanese force landed in Chemulpo, 8 Feb. 1904. On the following day a Japanese squadron under Admiral Urin destroyed a Russian cruiser and gunboat outside the harbor. Pop. about 26,000, of which 14,000 are Japanese.

CHEMUNG, shĕ-mŭng', **Battle of the,** in the Revolution, 29 Aug. 1779, the decisive engagement of John Sullivan's campaign, to harry the Iroquois country. The Indians and their Tory allies made a stand in force at the Chemung River, about a mile southeast of Newtown (Elmira), N. Y. They had five companies of British troops and rangers, numbering about 250; and the entire fighting strength of the Six Nations. These Indians the Tory authorities state as 550; but this seems impossibly small, and Sullivan and his officers, from a careful estimate of various factors, place it at 1,200 or 1,300. Sullivan had about 5,000. The Indians were led by their Napoleon, Brant (Thayendanegea); the Tories by Col. John Butler, with Sir John Johnson, and perhaps Guy Johnson, Maj. Walter N. Butler and Captain MacDonald. Their line was in advance of the river, resting on a bend at the right. From the bend ran a breastwork half a mile long, flanked by bastions and having a dwelling in front turned into a blockhouse; it was concealed by a mass of pines and scrub-oaks, some of them cut from other places and stuck down to make a seemingly thick virgin forest. From their left a thin line was continued about a mile and a half to a steep ridge parallel to the river, where a strong detachment was posted; and a mile further east was another ridge parallel to the first, with a breastwork and another company, the two advance detachments designed to take the Americans in flank and rear. Along the front of the main breastwork ran the road to Newtown, exposing the whole American flank

to a raking fire. The entire works formed a magnificent ambuscade; but Sullivan, who was no Braddock, guessed the utility of the ridges and knew what scouting parties were for. About 11 A.M. of the 29th Major Poor beat up the position, and General Hand formed his infantry in a wood 400 yards from the works and waited for the rest of the army. Sullivan ordered Poor to carry the hill at his right and take the British in rear, while the main body with artillery attacked the front. Steadied by Brant, a warrior of great force and sagacity, the Indians not only made a stubborn resistance for two hours, yielding inch by inch, but even stood up against the bayonet, something almost unknown in Indian history. At first thrown into a panic by the artillery, Brant rallied them to a fresh and tenacious fight; and noting Poor's turning movement, threw a strong detachment with a battalion of rangers to the hill to oppose it. But at length Poor, having cleared the crest, burst on the rear with a bayonet charge; and both Indians and whites fled across the river in rout, the Indians leaving their packs and weapons behind, and 11 dead, though they usually carry all these away with them. Fourteen other dead Indians were in fact found under the leaves, two canoes were found covered with blood and the Indians told their western villages that they had many killed and vast numbers wounded. The Americans had 6 killed and 40 or 50 wounded.

CHEMUNG SERIES, in American geology, the great series of shoal-water sediments, mostly light gray shales and ripple-marked sandstones, that were laid down in Upper Devonian time in the great northeastern bay of the interior sea that covered much of what is now the Mississippi Valley. This northeastern bay stretched across lower Michigan, Ontario and central New York, reaching nearly to the Hudson River. The Chemung Series includes the Catskill Group and is divided into the Chemung and Portage Stages. It is typically developed on the Chemung River in New York. It reaches its maximum thickness of 8,000 feet in eastern Pennsylvania, but thins out and disappears to the south and west. The "oil sands" of Pennsylvania, from which have been taken many millions of barrels of petroleum, are in part of Chemung Age.

The Chemung corresponds to part of the series of shales and limestones laid down in the Northwest Territory and Manitoba, Canada, probably to part of the Devonian strata that extend along the main range of the Rocky Mountains in Canada and to an unknown fraction of the great thickness of Devonian strata in Nevada. In Europe the Old Red Sandstone, a series of sandstones and shales estimated as possibly 10,000 feet thick, is in many respects like the Catskill Group of the Chemung, and contains similar fossils. This great sandstone formation is found in South Wales, England and Scotland, near the Baltic Sea in Russia, in Spitzbergen and in Greenland. See CATSKILL GROUP; DEVONIAN SYSTEM; OLD RED SANDSTONE.

CHENAB, chē-nŏb', in Hindustan, one of the five rivers of the Punjab. Its affluents are the Jhelum and the Ravi. It rises in the Himalayan ranges of Cashmere, and entering the Punjab near Sialkot flows in a southwestern direction till it unites with the Sutlej; length about 600 miles. Its greatest depth is 14 feet; its greatest width 1¾ miles. At Wazirabad it is crossed by a great iron railway bridge more than a mile long.

CHENAVARD, chā-nȧ-vär', **Paul Joseph,** French historical painter: b. Lyons, 9 Dec. 1808; d. 12 April 1895. He studied at Paris and spent some years in Italy, and acquired a reputation by his picture of 'Mirabeau Replying to the Marquis de Dreux-Brezé.' After the revolution of 1848 he received a commission to paint large compositions for the decoration of the Pantheon. Among these are 'The Deluge' and 'The Passage of the Rubicon.' The Pantheon having been restored to the Roman Catholic worship, he was not permitted to finish the task. Consult Germain, 'Les artistes Lyonnais' (Lyons 1910).

CHENERY, Thomas, English journalist and Orientalist: b. Barbadoes 1826; d. 11 Feb. 1884. He was educated at Eton and Cambridge. He was called to the bar, but was soon after sent out as *Times* correspondent to Constantinople and was chiefly located there during the Crimean War. Afterward he was constantly employed on the *Times* staff until 1877, when he became its editor, a post which he filled till within 10 days of his death. As a singularly thorough Hebrew and Arabic scholar he had few equals among his contemporaries, and his translation of the Arabic classic, the 'Assemblies of Al Hariri' (1867), led to his appointment to a chair of Arabic at Oxford in 1868. He was one of the company of Old Testament revisers, and besides other works published an edition of the 'Machberoth Ithiel' (1872), a Hebrew version of the 'Assemblies.'

CHENEY, Charles Edward, American clergyman: b. Canandaigua, N. Y., 12 Feb. 1836. He was graduated from Hobart College, A.B., 1857, following which he took the course at the Protestant Episcopal Theological Seminary at Alexandria, Va., and he received the degree of D.D. from Iowa College in 1871. He was ordained in the ministry of the Protestant Episcopal Church 1858, and after two brief pastorates in New York State became rector of Christ Church, Chicago, in which relation he has continued ever since. During the years from 1869 to 1873 he became involved in ecclesiastical difficulties growing out of doctrinal views concerning baptism, and, in 1873, he joined Bishop George David Cummins, D.D., in the organization of the Reformed Episcopal Church, and 14 Dec. 1873 was consecrated bishop of the Reformed Episcopal Church, with jurisdiction over the churches of the Northwest, subsequently becoming bishop of the Synod of Chicago, in which position he continues, retaining also the rectorate of Christ Church. In 1908 he received the degree of S.T.D. from Hobart College. He is a member of the American Historical Association, American Geographical Society, Chicago University Club, Chicago Historical Society, Chicago Literary Club, the Illinois Society of the Sons of the Revolution and the Illinois Society of Mayflower Descendants. Besides a volume of 'Sermons,' published 1880, is author of 'What Do Reformed Episcopalians Believe?' (1888); 'The Enlistment of the Christian Soldier' (1892); 'A King of France Unnamed in His-

tory' (1902); 'The Second Norman Conquest of England' (1907); 'A Neglected Power' (1915).

CHENEY, John Vance, American poet and essayist: b. Groveland, N. Y., 29 Dec. 1848. He was librarian of the public library at San Francisco, 1887–94, and of the Newberry Library, Chicago, from 1894–1909. He has published 'The Old Doctor' (1885); 'Thistle-Drift' (poems, 1887); 'Wood Blooms' (1888); 'The Golden Guess' (a volume of essays, 1893); 'That Dome in Air' (essays, 1895); 'Queen Helen' (1895); 'Out of the Silence' (1897); 'Lyrics' (1902); 'Poems' (1905); 'The Time of Roses' (1908); 'At the Silver Gate' (1911). Editor of 'Wood Notes Wild,' by Simeon Pease Cheney, with appendix and notes (1892); Caxton Club's edition of Derby's 'Phœnixiana' (1897); 'The Caxton Club Scrap-Book' (1904). Member of the Authors' Club and of the National Institute of Letters.

CHENEY, Seth Wells, American engraver: b. South Manchester, Conn., 26 Nov. 1810; d. there, 10 Sept. 1856. Upon the death of his father in 1829 he joined his brother John in Boston, where he entered the latter's profession, that of an engraver. A position in the Athenæum enabled him to study and work from casts and drawings, and he copied and engraved in 1832 Washington Allston's picture, 'Mother and Child,' which was afterward burned. In 1833 he studied in Paris in the atelier of Delaroche. His great power was in the expression of character in individual heads. He never attempted historical or genre subjects, and only rarely would he group two or more heads. James Russell Lowell, Theodore Parker and William Cullen Bryant are among the best known of his studies. Consult 'Memoir of Seth W. Cheney, by E. D. Cheney' (Boston 1881) and Koehler, S. R., 'Catalogue of the Works of John and S. W. Cheney.' His wife, Ednah Dow Cheney (b. 1824; d. 1904), was an author of note. She was active in the Freedmen's Aid societies and was a pioneer of the woman suffrage.

CHENIER, shā-nyā', **André Marie de,** French poet: b. Constantinople, 30 Oct. 1762; d. Paris, 25 July 1794. He went to France when very young and entered the army, but left six months after to devote himself to literary pursuits. He was for about three years secretary to the French embassy at London, but in 1790 returned to Paris. Advocating the doctrine of a limited monarchy, he made himself equally offensive to the Royalist and the Jacobinical parties. In consequence of his attacks on the Jacobins he was condemned by the revolutionary tribunal, and executed. Although but little known in his own day, Chénier has long been regarded as one of the finest French poets of his century, his chief characteristics being purity of form combined with vigor of thought and diction. He wrote idyls, elegies, odes (including one to Charlotte Corday), dithyrambs, philosophic pieces, etc. The maturity, breadth and soundness of his judgment in poetical composition are demonstrated by his poem on 'Invention.' Similar in spirit to this, and of perfect Pindaric form, is the 'Dithyrambic on the Tennis Play' (1791). In his prison of Saint Lazare he composed a beautiful elegy, 'The Girl Captive,' and the 'Iambes' which owing to their spiritual affinities, are often likened to the poems of John Keats. Consult Becq de Fouquières, 'Lettres critiques sur Chénier' (Paris 1881); Faguet, 'André Chénier' (Paris 1902); Heller, 'André Chénier' (New York 1895); Valée, 'Chénier et les Jacobins' (Paris 1881).

CHENIER, Marie Joseph de, a French dramatist, younger brother of André M. Chénier (q.v.): b. 11 Feb. 1764; d. 10 Jan. 1811. He was a Jacobin, and a member of the Legislative Assembly during the Revolution. His tragedies — 'Charles IX' (1789); 'Henry VIII' and 'Calas' (both 1791); 'Caius Gracchus' (1793); and others — brought him fame and success by the accordance of their republican and revolutionary sentiments with the public opinion of the time, rather than by their merits as compositions. His national songs were approved by the best test of such productions,— popularity; one of them, 'The Parting Song' (*Partant pour la Syrie*), is hardly less famous than the 'Marseillaise.' His satires are full of spirit, point and wit, but often rancorous and unjust. His translations from ancient and modern poets were excellently rendered. Consult 'Marie-Joseph Chénier als Kritiker und satirischer Dichter' (Leipzig 1911).

CHENILLE, shę-nēl', a round fabric or trimming, made by uniting with two or more sets of warps, either by weaving or twisting, a fine filling or weft, which is allowed to project beyond the warps. This filling is cut at its outer edges and the fabric is then twisted, assuming a cylindrical shape with weft projecting radially from the central line of warps. The name is applied, also, to lace, carpets and cloth made wholly or in part from silk threads twisted or woven to resemble the tufted trimming of the same name.

CHENOMORPHÆ, kē-nō-môr'fē, an order of desmognathous birds, first proposed by Huxley and nearly equivalent to the *Lamellirostres* and *Anseres* (q.v.) of other authors. The palate is closed anteriorly by a thick bony bridge, but the vomer is well developed; the margins of the beak are more or less toothed; the tongue is thick and fleshy; and the down is uniformly distributed over the skin. All of the species are more or less aquatic; most of them are web-footed; and the young are precocial, or able to run from birth. Three very distinct families are recognized: the *Anatidæ*, or ducks, geese and swans (qq.v.); the *Palamedeidæ*, or screamers (q.v.); and the *Phœnicopteridæ*, or flamingoes (q.v.).

CHENONCEAUX, shĕ-nôṅ-sō. See BLÉRÉ.

CHENOPODIACEÆ, kē-nō-pō-dĭ-ā'sę-ē, a family of apetalous dicotyledons, consisting of more or less succulent herbs or shrubs, belonging to about 80 genera and 600 species. They are mostly innocent weeds, but several, as spinach and beet, are employed as pot-herbs; others for the manufacture of soda. See CHENOPODIUM.

CHENOPODIUM, kē-nō-pō'dĭ-ŭm, or **GOOSEFOOT,** a genus of plants belonging to the family *Chenopodiaceæ* (q.v.), of which it is the type, and distinguished by its usually perfect flowers, having mostly five small green scales for the calyx, about five stamens, no corolla and a fruit consisting of a membranous

coat enclosing one black, flat and shining seed. A number of the species have received the name of goosefoots, from a fancied resemblance to the webbed foot of the goose. The best-known or more remarkable species are:

1. *C. album* (lamb's quarters, pigweed), a common annual, found in cultivated and also waste ground. It has a leafy angular stem, which, as well as the whole plant, is white-mealy. The young plants are much used in North America as "greens."

2. *C. bonus-henricus* (Good King Henry, or wild spinach), a perennial, in Europe not uncommon in country churchyards and places seldom disturbed, sparingly naturalized in North America. It has bright green, broad, succulent leaves, which were in common use as spinach before the introduction of the present cultivated plant. The early shoots are sometimes used as a substitute for asparagus.

3. *C. quinoa*, the quinoa of Peru, a perennial inhabiting the high table-land of the Cordilleras, where, at the conquest of the Spaniards, it was one of the important farinaceous grains used as food. It is still largely cultivated for its nutritious seeds, which are made into soup and bread, and, when fermented with millet, make a kind of beer. The plant is from four to six feet high and has many angular branches, dull glaucous leaves of a jagged triangular outline, on long narrow stalks, and flowers forming large compact branched heads and succeeded by minute strong flat seeds of a black, white or red color.

In medicine, *Chenopodium, ambrosioides,* is used very extensively as a remedy for the round worm as well as the tape-worm. The oil is the officinal part used, in doses of 5 to 15 drops, and it is a very efficient anthelmintic, particularly for the round worm, *Ascaris lumbricoides.*

CHENOWETH, Alexander Crawford, American engineer: b. Baltimore, Md., 5 June 1849. He was graduated at Dickinson College in 1868 and studied engineering at the Rensselaer Polytechnic Institute. In 1870 he was engaged on the engineering force of Prospect Park, Brooklyn, was assistant engineer of the Middletown-New Haven Railway 1871, assistant under General Green of the public works of Washington, D. C., contractor for dock and railway work of the West Shore Railroad in 1882 and consulting engineer to President Prado of Peru. He prepared the foundation for the Bartholdi Statue of Liberty in New York harbor 1884, was assistant engineer of the Croton aqueduct commission 1885 and resident engineer 1889–95. In the latter year he resigned to undertake construction work for the United States government at Sandy Hook. He specialized in foundation work and was awarded many medals and prizes. He invented a steel-concrete pile for pier and foundation work; the Chenoweth reinforced concrete revetment for maintaining the banks of the Mississippi, Missouri and Colorado rivers. He discovered at Inwood, Manhattan Island, a village site of prehistoric Indians from which he excavated a collection of implements now in the American Museum of Natural History, New York.

CHENOWITH, Caroline van Dusen, American writer: b. Louisville, Ky., 29 Dec. 1846. She has lectured on English literature and history and is the author of 'Stories of the Saints' (1880); 'Child Life in China' (1882); 'School History of Worcester, Mass.' (1899); 'An Undistinguished Citizen' (1900); 'History of the Second Church in Leicester, Mass.' (1908); 'Stories of Stonewall Farm' (1913); and contributions to various magazines and reviews.

CHENSTOCHOW, chen'stō-kov', Poland, town in the Russian government of Piotrkow, on the Warthe, 135 miles southwest of Warsaw, on the Warsaw-Vienna Railway. It consists of the old and new towns and contains several cotton-mills, foundries, paper-mills, flour-mills and breweries. There is considerable trade in the products of these plants and also in lithographs, printing and religious emblems. Near the town is the famous monastery of the Order of Saint Paul the Hermit, which is visited annually by about half a million pilgrims. A great object of veneration is the picture of the Virgin, made of dark wood, and known to Polish Catholics as the "Black Virgin." It is attributed to Saint Luke the Evangelist and is said to have been brought to the monastery in the 16th century by Dr. Walter Lynch, bishop of Cloufert, Ireland, then exiled from his see. The monastery was at one time strongly fortified and in 1655 was unsuccessfully besieged for 38 days by Swedish troops. Pop. 69,500.

CHEOPS, kē'ŏps, the name given by Herodotus to the Egyptian despot whom the Egyptians themselves called Khufu. He belonged to the rulers who had for their capital Memphis; lived about 2800–2700 B.C., and built the largest of the pyramids. According to Herodotus he employed 100,000 men on this work constantly for 20 years. Several monuments bearing his name have survived.

CHEPHREN, kĕf'rĕ, or **CEPHREN,** king of Egypt, the successor of Cheops and the builder of the second pyramid. The former is the form of his name as it is found in Herodotus, the latter is the name given to him by Diodorus. Herodotus informs us that his reign was in all respects as tyrannical as that of his predecessor, and that the Egyptians, animated by a feeling of hatred against these two kings, under whom they had suffered all kinds of oppression and during whose reigns the temples had never been opened, avoided even the mention of their names; and hence, instead of naming the pyramids after their builders, named them after a shepherd called Philition, who used the land in the neighborhood of the pyramids for pasturage. Diodorus adds that the pyramids were intended to serve as tombs for their builders, but as the people threatened to break them open and remove the bodies, both the kings desired their friends to bury them in some spot where their bodies might remain undisturbed. Herodotus makes Chephren the brother of Cheops; but Diodorus says that Chembes, who is the Cheops of Herodotus, was succeeded by his son, Chabryis, who may perhaps be the same with the Chephren of Herodotus. His reign lasted 56 years.

CHEPSTOW, chĕp-stō, England, town and port in county of Monmouth, on the Wye River, two miles from its junction with the Severn and 14 miles north by west of Bristol. It is pleasantly situated on a slope descending gradually to the river and has spacious, well-

paved and well-lighted streets. The principal edifices are the church, a fine specimen of Norman architecture, and the old castle, the ruins of which crown a lofty cliff overhanging the Wye. The ruins of Tintern Abbey are in the vicinity. There is a river and coastal trade. The beauty of the environs is an attraction to visitors. Both the town and the castle are referred to in 'Domesday Book.' Pop. 2,953.

CHEQUE. See CHECK.

CHEQUEN, chek-wen', the leaves of *Eugenia chequen,* of the family *Myrtaceæ.* A shrub of Chile and Bolivia, whose leaves are rich in volatile oil and are used as a tonic expectorant in much the same manner as Eucalyptus.

CHEQUERS ESTATE, an official country residence for British prime ministers, presented for that purpose by Sir Arthur Lee, K.C.B., M.P., in 1917. The actual transfer of the property to the nation may not take place during the lifetime of the present owners; after their death it will be maintained in perpetuity as the official country residence of the Prime Minister for the time being, or, failing him, the full privileges of residence to be offered in turn to the Chancellor of the Exchequer, the Foreign Secretary, the American Ambassador, the speaker and four other Cabinet ministers. Chequers stands in a sheltered hollow of the Chiltern Hills, about 36 miles from London. The history of the mansion goes back to the 12th century; it contains a number of Cromwell relics, a fine library and a valuable collection of manuscripts and autographs, letters of Napoleon, Washington, Charles I, Pitt, Franklin, etc. The area of the estate is about 1,500 acres, consisting of gardens, grounds, farms, woods and Coombe Hill. The hill, 852 feet high, was presented to the nation in 1913.

CHER, shār, France, inland department having on the north Loiret, east Nièvre, south Allier, west Indre and Loiret-Cher, between lat. 46° 26′ and 47° 38′ N. and long. 1° 50′ and 3° 3′ E., and formed of parts of Berry and Bourbonnais. It is named from the river Cher, which traverses it southeast to northwest. Area, 7,199.34 square kilometers, or 2,779 square miles; capital, Bourges. This department is included in the basin of the Loire, which forms the greater part of its eastern boundary. The climate is mild and pleasant. The surface is in general flat, but is diversified in the north by chains of inconsiderable hills. The soil varies but is fertile in the neighborhood of the Loire and Allier. Heath and sand prevail in the northern districts. The forests occupy above a sixth of the area and furnish large quantities of fuel for the iron-works and timber for shipbuilding. Pastures are extensive and sheep very numerous. Grains, chestnuts, hemp, vegetables, fruit and wines are among the important products. The best wines are those of Chanignol and Sancerre. Beets, buckwheat and flax are also grown. The minerals consist of iron, lithographic stones, good building- and grind-stones, flint, marble, ochre and potter's earth. The preparation and manufacture of iron, called Berry-iron, is the principal branch of industry. The manufactured articles are metal goods, fine and common cloth, woolen goods, faïence, porcelain and earthenware, sacking, beet-sugar, nut oil, paper and glass. The department is divided into three arrondissements, 29 cantons and 290 communes. Bourges is the capital. Consult Frémont, 'Le département du Cher' (Bourges 1862). Pop. 337,810.

CHER, a river of central France, rising in Auvergne in the department of Creuse and joining the Loire from the left near Tours; length, 220 miles. It is navigable to Vierzon. This river gives name to the department of Cher.

CHERASCO, kā-rās'kō (ancient CLARASCUM), Italy, a town in Piedmont, in the province of Cuneo, near the confluence of the Stura and Tanaro, 36 miles south of Turin and 22 miles northeast of Coni. Its fortifications, once of great strength, were demolished by the French in 1801. It was repeatedly the object of contest between the French and Austrians in the wars of Italy, terminated in 1631 by a peace concluded here; and in 1796 Napoleon, by what is called the Armistice of Cherasco, obtained a free passage for his troops through the Sardinian states. The town is well built, and has several silk-mills. It has a domed church, two triumphal arches, a gymnasium and a technical school. It markets grain, wine and truffles, and manufactures silk. Pop. 9,312.

CHERAW, chē-râ, S. C., town in Chesterfield County, 88 miles northwest of Columbia, on the Atlantic Coast Line, the Seaboard Air Line and other railroads, and on the Pee Dee River. It contains lumber plants, cottonseed-oil mills, box factories, planing mills and sash and door factories. For a time during the Civil War the Confederates maintained a supply depot here. The town was taken by Sherman 3 March 1865, when a vast amount of stores, including 3,600 barrels of gunpowder, was destroyed. The waterworks are municipally owned. Pop. 2,873.

CHERBOURG, shār-boor, France, a seaport in the department of La Manche (The Channel), 196 miles west-northwest of Paris, on the north coast of the peninsula of Cotentin, and nearly due south of Southampton. It has a strongly fortified arsenal, and consists of the old or civil town and the new or military (Port Militaire), the latter quite distinct from the former, and separated from it by the fortifications with which it is surrounded. Apart from its consideration as a naval station, Cherbourg is unimportant; it is the works by which it has been converted into a great naval fortress and place of arms that give it its special importance. These altogether have cost £8,000,000 and were chiefly carried out under Napoleon I, Louis Philippe and Napoleon III. Foremost among them must be mentioned the *digue,* or breakwater, stretching across the entrance to the roadstead, which was formerly open to heavy seas from the north. It is more than two miles in length, of very massive construction, covers an area of 3,700 acres and consists of a western or longer and an eastern or shorter portion, forming at their junction a very obtuse angle pointing toward the north. There are a fort and lighthouse there, and, also, at either end. The breakwater alone cost about £2,700,000. The eastern entrance to the harbor, between the breakwater and the island of Pelée, is about 500 yards wide; the western en-

trance, between the breakwater and Fort Chavagnac (on a rocky islet), is about 1,000 yards. It is the latter that large ships of war make use of.

The Port Militaire has three great basins for war vessels — an outer accessible at all states of the tide for vessels of the largest class; a floating basin communicating with this by gates; and a third communicating with both by similar gates. The aggregate water area of the three basins is about 56 acres, the depth of water being from about 30 to 50 feet. They have been excavated from the solid slate rock which forms the foundation of the entire dockyard, much of the excavated material being used in the construction of the breakwater. There are also slips for vessels of the largest dimensions, dry docks, building sheds, masthouses, boiler-works, and in short everything necessary for the building and fitting out of ships of war. The numerous forts and other works with which Cherbourg is defended render it, if not impregnable from the sea, at least very difficult of attack. The commercial town has quite a modern aspect, the streets being generally wide, regular, well paved and clean, but it is rather dull and uninteresting. There is an outer harbor, entered from the sea by a passage between two jetties, and an inner harbor or floating dock. The principal industries of Cherbourg are centred in the works of the dockyard, the commercial trade and manufactures being otherwise comparatively small. The Hôtel de Ville possesses a notable collection of paintings. The celebrated artist, J. F. Millet, was born near by.

Cherbourg is supposed to occupy the site of a Roman station, which is said to have borne the name of Cæsaris Burgum. Aigrold, king of Denmark, we are told, resided here about 945 A.D. William the Conqueror founded a hospital in it, and built the castle church. The English held possession of the place till about 1200. The castle, in which Henry II frequently resided, was one of the strongholds of Normandy, and escaped the fate of the town, which, about 1295, was pillaged by an English fleet from Yarmouth; but it sustained afterward three memorable sieges, in 1378, 1418 and 1450. In 1758 the town was taken by the English without opposition, notwithstanding that the garrison was large. They kept possession of it eight days, destroyed the fortifications, carried off the artillery and the bells, and only retired after having exacted a heavy ransom from the inhabitants. The completion of the fortifications was celebrated by Napoleon III in 1858, the festivities being graced by the presence of Queen Victoria. A statue of Napoleon I was unveiled on the occasion. It was after leaving Cherbourg that an end was put to the career of the Confederate cruiser *Alabama,* when it was sunk by the Federal cruiser *Kearsarge,* 19 June 1864. Pop. of commune (1911) 43,731.

CHERBULIEZ, shăr-bü-lē-ā, **Charles Victor,** French writer: b. Geneva, 19 July 1829; d. Melun, 1 July 1899. He belonged to a family noted for literary attainments. Having studied in the universities of Geneva, Paris, Bonn and Berlin, he was for a time an educator at Geneva; but in 1864 became one of the editors of *Revue des Deux Mondes.* He first gained distinction as art critic and observer of public affairs, as also by his writings, under the pseudonym G. VALBERT. He wrote a volume of art travels in Greece; 'A Horse by Phidias'; 'Political Spain'; 'Foreign Profiles'; 'Art and Nature,' etc. His works are characterized by clever treatment of the problems of domestic and social life and a fine psychological analysis, with a marked bias for description of odd characters. Among his most successful novels — and their success has hardly been less abroad than at home — are 'Romance of a Respectable Woman' (1866); 'L'Aventure de Ladislas Bolski (1869); 'Samuel Brohl et Cie' (1877). The last two were dramatized, but won little popular favor on the stage. He was made a member of the French Academy in December 1881.

CHERET, shę-rā', **Jules,** French lithographer and artist: b. Paris 1836. He was apprenticed to a lithographer and was self-taught as a draughtsman. His posters in color became famous because of their opening up a new field by making designs of this kind into a real art. He is also noted as a mural painter, the best known of his works in this field being the dance scenes 'Life's Joys' in the Hôtel de Ville, Paris. His best posters are 'Bal de Valentino'; 'Le petit Faust'; 'Pan'; 'Scaramouche'; 'Loie Fuller,' and 'Jardin de Paris.' Consult Alexandre, 'Jules Cheret, catalogue de ses œuvres' (Paris) and Kahn in *Art et Decoration* (ib. 1902).

CHERIBON, shĕr'ī-bŏn, Java, province or residency on the coast toward the northwest of the island, between Krawang and Tegal. It was formerly an independent kingdom. It has a population of about 1,500,000. The productions are coffee, timber, cotton, areca-nuts, indigo, sugar and also a little pepper. The rhinoceros is native here. The capital of the province of the same name is on the north coast, at the mouth of the river Cheribon. The houses are mostly of bamboo. The finest tomb in Java, that of Mulano, who introduced Mohammedanism into the island, 1406 A.D., is near here. It has a good harbor, and although it has lost to a great extent its commercial importance, it still has a considerable trade in coffee, indigo and teak-wood. Population of the city, about 20,792.

CHERIMOYA, chē-rē-mō'-yā, the fruit of *Annona cherimola,* a plant of the family *Annonaceæ,* native of South America, allied to the custard-apple. It is a heart-shaped fruit with a scaly exterior, and numerous seeds buried in a delicious pulp. Both flowers and fruit emit a pleasant fragrance. This fruit is now cultivated in various tropical regions.

CHERITH, kē'rĭth, the name of a brook to which Elijah was sent during a portion of the years of famine (1 Kings xvii, 3–7), but the locality of which is no further designated than that it was before or on the face of Jordan. The most probable opinion is that it is to be sought for on the east side of the Jordan.

CHERKASK, chĕr'kąsk, or **TCHERKASK,** two towns of Russia, in the government of the Don Cossacks, called Old and New Cherkask, or Staro-Cherkask and Novo-Cherkask. The former is on the right bank of the Don; the latter is 11 miles farther north, on a hill above the Aksai. Old Cherkask, a very ancient place, the foundation of which is attributed to a

Greek colony, is situated on an island formed by the Don, the Aksai and one of its branches, and is built on piles, as a protection from the inundations which continue from the beginning of April till the end of June. New Cherkask, founded in 1805, has a large cathedral and carries on a considerable trade. It is the seat of government of the Don Cossacks. Pop. about 40,000.

CHERMSIDE, Sir Herbert Charles, English general: b. Wilton, Wiltshire, 31 July 1850. He was educated at Eton and entered the army in 1868, and after successive promotions attained the rank of major-general in 1898. He was with the Egyptian army, 1883–88; consul for Kurdistan, 1888–89; military attaché at Constantinople, 1889–96; and governor of Queensland from 1901–05. He was created G.C.M.G. in 1899.

CHERNOZEM, chĕr'nō-zĕm (Russian «black earth»), Russian name for a fertile dark-colored soil which covers nearly all the southern half of European Russia and extends into Asiatic Russia. Similar soils are found in Galicia, Rumania, Bulgaria and around Magdeburg and Hildesheim in Germany and in the prairie regions of the United States and in the pampas of Argentina. Chernozem contains from 6 to 20 per cent of humus with about 5 per cent of nitrogen. There is also about one-fouth of 1 per cent of phosphoric acid and from one-third to 1 per cent of potash. Such soil is rich in plant food, is of great depth and continues to bear the same crops year after year without deterioration. Under certain weather conditions, however, it becomes hard and compact so that crops fail. Consult Kossowitsch, P., 'Die Schwarzerde' (Vienna and London 1912).

CHEROKEE («uplanders,» their own name; also, rendered Tsaraki, Tsalaki and Tsanaghi), the largest and most important Indian tribe originally east of the Alleghanies, perhaps the highest in culture and intellectual receptivity north of Mexico. They are of Iroquoian stock, though remotely, and are believed to be identical with the Tallagewi of Delaware tradition, a large tribe once occupying the Ohio and Alleghany valleys, till driven south by the Delawares and Iroquois. Their own tradition, that they came from the west and exterminated a certain «moon-eyed people,» does not contradict this. The first white men who encountered them were those of De Soto's expedition in 1540. Our first definite information finds them located along the south—Allegheny and Appalachian ranges and the Piedmont region adjoining, from Virginia to Georgia and Alabama, a range about 120 miles square — and divided into two main branches speaking different dialects: the Otari Tsaraki or Atali Tsalaki (Upper Cherokees), whose main settlements were around the head-waters of the Tennessee and Cumberland; and the Erati Tsaraki or Elati Tsalaki (Lower Cherokee), centred in northern Georgia and southern North Carolina, around the head-waters of the Savannah and Chattahoochee. These location names, however, had become fixed tribal names, and persisted after the Upper Cherokee had been forced south into the region of the others. They were further divided into seven clans, forbidden to intermarry. Lying close to the stream of immigration in the southern colonies, they fill the most conspicuous place in the Indian wars, trade and treaties of that section in the 17th and 18th centuries; and their chief southernmost town, Etowah, gave a name to the famous frontier fortress Ninety-Six (96 miles from it). At the beginning of the 17th century they are said to have had 64 towns and 6,000 warriors, the latter declining to 3,000 by 1769 and 1,500 by 1793; but the figures are very dubious. At any rate, they had many villages of well-built log houses, and the Upper Cherokee were agriculturists, raising large crops of corn, beans and pumpkins; the Lower were chiefly huntsmen. They sided with the English in the early colonial struggles, and in 1730 formally recognized the supremacy of the English king (though it may be doubted if they attached that interpretation to their marks). In 1755 they ceded a large tract of land to South Carolina under Governor Glenn, and Fort Loudoun was built in their territory, it is said by their own request. But after the reduction of Fort Duquesne in 1758, the slaughter of some Cherokees for horse-stealing set the whole tribe aflame, and they requited the massacre ten-fold. The folly of the then governor of South Carolina (Littleton) prevented an arrangement from being made, and a fearful Indian war desolated the borders till 1761, when the harrying of their lands for a month and the burning of 14 villages caused them to sue for peace. Their principal chiefs at this time were Attakullakulla or Little Carpenter, and Oconostota. In 1773 they made a large cession to Georgia.

In the Revolution, like most other Indians, they joined the English, their natural interests being against the Americans; and also like the others, their alliance won no victories for England, but helped her to lose the country from the immeasurable odium it excited. General Pickens at last subjugated them; and by a treaty at Hopewell, 28 Nov. 1785, they acknowledged the sovereignty of the United States. This was confirmed by that of Holston, in 1791, with a cession of territory; and other treaties and cessions followed in 1793, 1804, 1816, etc., ending 27 Feb. 1819. The United States on its part solemnly guaranteed to the Cherokees the possession of all lands not ceded by them, recognized their autonomy, and on 30 March 1802, authorized the President to expel trespassers, especially surveyors, by force. In 1790 a portion of the tribe emigrated to Louisiana; and others, mainly Lower huntsmen, later removed from time to time beyond the Mississippi, till in 1817 there were some 3,000 north of the Arkansas in the present Indian Territory. But the remainder showed an adaptability not equaled by any other Indians, and began a vigorous civilized career, which however only postponed their evil day for a few years. Two influences conduced to this besides their character,— the missionaries and the half-breeds: for almost alone among Indians, the mixture of white blood has prospered with the Cherokees. This blood, however, was singularly fine — that of the best Scotch families, in some cases noble: the Rosses, Adairs, McLeods, McDonalds, etc. After the rising of 1745 a number of these, irreconcilable or «wanted,» emigrated to the Carolinas; in the Revolution, not unnaturally, they became Loyal-

ists; when it ended and a fresh outlawry menaced them, some of them and their sons pushed on into the Cherokee country, settled there and intermarried with the native women. The Moravian missionaries had been working among the Cherokees from 1740, and had baptized a considerable number before the Revolution. In 1799 some of the tribe earnestly requested teachers and clergy. A great council was held at Tellico on the Tennessee, at which the Upper chiefs agreed to the plan, but the Lower dissented. In 1804, however, schools and missions were opened, a large part of the tribe was soon christianized, and the sons of the chiefs attended the schools. The American Board worked successfully among them later.

The Cherokees were now perfectly peaceable, industrious and rapidly growing civilized in the genuine sense; and they did good service to the United States in the War of 1812. In 1810 they abolished the clan system and blood-feuds. In 1820 they organized a regular civilized government, including a legislature with paid members, and adopted a code of laws. In 1827 they took the name of The Cherokee Nation, and framed a constitution. In 1825 the Cherokee Sequoyah (q.v.) invented an alphabet of 85 letters, one for each sound in Cherokee, and it was officially adopted by the Cherokee government. In 1827 the first Indian press north of Mexico was established, and on 21 Feb. 1828 the first number of the *Cherokee Phœnix* was issued at New Echota, one-half printed in the new alphabet. But the nation's time had come, hastened by the discovery of gold, which they worked successfully. Georgia, on 24 April 1802, as consideration for ceding western lands to the United States, had stipulated that the Indian titles to lands within the State should be extinguished "as soon as it could be done peaceably and on reasonable terms." The government did its best, but found that it had promised the impossible. In 1808 both the Lower (hunters) and the Upper (farmers) sent deputations to Washington. The former expressed a desire to remove to the virgin hunting-grounds of the West, the latter to retain their own. The former, therefore, on 8 July 1817, were granted an exchange of lands to the West. This left about 5,000,000 acres of Georgia in the hands of the Cherokees, and 4,000,000 in those of the Creeks, or about 14,000 square miles in all, nearly a quarter the present area of the State,— the whole northwestern triangle above the line of Atlanta (which was Cherokee land) and Gainesville. In 1819 Georgia began to grow impatient, and memorialized the President to carry out the agreement of 1802. But the remaining Cherokees loved their beautiful and salubrious country, which they had covered with improvements; they had not much more in that mountain country than they needed; and the reports from Indian Territory were that their brethren were being badly harassed by the wild tribes of the plains. They refused to sell as a nation; by all Indian law, confirmed by the United States, no individual could sell, as the land belonged to the tribe; and to prevent sales they dared not disallow, the Cherokees in 1820 passed a law making such sale a capital offense in any member of the tribe. The Creeks duplicated this action in 1824. There was therefore no way for Georgia to rid herself of these two huge Indian states within her borders except by naked violence in defiance of United States treaties. She did so first with the Creeks, 1826–32, openly defying the United States, and proclaiming the separate sovereignty of Georgia (see CREEKS; NULLIFICATION); then in 1828–30 (see title below) passed laws extinguishing the government of the Cherokees and parceling out their land. The President (Jackson) would give no help, the Supreme Court said it could not; but the Cherokees clung desperately to their land even under the new legislation. Finally, on 29 Dec. 1835, a small fraction of the tribe, headed by a few influential men, were induced by an emissary of the United States to sign a cession of all tribal lands, in exchange for others in Indian Territory and the sum of $5,700,000, and agree to entire removal within three years. This was of course perfectly invalid; the leaders were immediately assassinated, and were execrated as bribed traitors. There is, however, no reason to doubt their good faith to the nation. One of them was the still remembered Elias Boudinot, editor of the *Cherokee Phœnix*, who was educated at Cornwall, Conn., and married a Connecticut wife. They probably thought the nation could make better terms by yielding than by holding out. The bulk of the tribe, however, repudiated the treaty, and, refusing to go in 1838, were deported by an armed United States force, after a strong resistance and some bloodshed. Many hundreds, however, escaped on the march, lingered about in the woods, and finally concentrated near the Great Smoky Mountains in western North Carolina, where about 1,400, called the Eastern Band, still live, mainly in Swain, Graham, and Jackson counties. Of those who went, thousands are said to have died on the march or from resultant hardships. The number deported is unknown: probably between 10,000 and 20,000.

The chief of the tribe for nearly 40 years (1828–66) was the able John Ross (q.v.), or Kooweskoowee, a Scotch half-breed; and after fighting the removal to the last, when the crisis came he superintended it. When the tribe had gathered in Indian Territory it resumed its form of government and made Tahlequah the capital; and in 1845 resumed publication of a national paper, the *Cherokee Advocate* — which, however, was suspended in 1854, the present paper of the name dating only from 1870. The nation was doing well till the Civil War came as a blight. The Cherokees were almost equally divided in sentiment; their treatment by Georgia had been capped by that of the national government, and after all they were Southerners by birth and industrial sympathies, and slaveholders. Each section furnished a large body of troops to its chosen side, and in consequence each side in turn ravaged the country as a hostile land, and with the consideration usually shown by whites to Indian property; and the land was almost swept bare. After the war they made a new treaty with the United States, freeing their slaves and admitting them to full citizenship in the tribe: and in 1866 they absorbed the remnant of the Delawares. Since then their land has been opened up by railroads, despite their protests. The case of Cherokee Nation v. Southern Kansas Railway, 1889, decided that the United States had right to grant eminent domain through their territory, and in

fact four trunk lines traverse it. In 1892 they sold their great western extension, known as the Cherokee Outlet, and it forms the larger part of northern Oklahoma. Their region is the whole of Indian Territory north of the Arkansas. Their government was by an elected principal chief, and a legislature with two chambers. The open policy of the United States government to substitute allotment in severalty for tribal ownership as fast as possible, and put an end to the anomaly of independent tribes with a figment of sovereignty which only makes hardship to government, tribe and innocent outsiders alike went into effect, 30 June 1914, when the tribal government was abolished. No tribe was better fitted for the change than the Cherokee; generations of good living and civilization having not only tamed and elevated the Indian character in them, but greatly modified even the Indian physiognomy; there are scores of full-blooded Indian ladies in Tahlequah scarcely distinguished from whites save for duskiness of skin. A thorough system of public schools among them has been one of the chief instrumentalities in refining both face and character at once.

The 1915 annual report of the superintendent for the five civilized tribes stated there was contained in the Cherokee nation a total of 4,420,068 acres, of which 22,880 acres were reserved for town sites, railroad rights of way and other purposes; 4,346,203 acres were allotted to 40,193 citizens and freemen; and the remainder, consisting of 50,905 acres, was sold except an 80-acre tract which was involved in litigation, and a 226-acre tract included in what is known as Big Lake, the title to which had not yet been definitely determined. The tribal affairs of the Cherokee nation were completed with the exception of the disposition of the 306 acres above mentioned, by the delivery of approximately 750 deeds; the completion of the per capita and equalization payments to citizens and freedmen of the nation; and payment of the amounts due to citizens and freedmen enrolled under the act of 1 Aug. 1914.

CHEROKEE, Iowa, city and county-seat of Cherokee County, 60 miles northeast of Sioux City, on the Illinois Central Railroad and on the Little Sioux River. The State hospital for the insane is located here and there is a Carnegie library. There are also here railroad repair shops, butter factories, mill machinery and novelty works. The city was settled in 1850 and was incorporated in 1872. The government is vested in a mayor and a unicameral council. The waterworks are municipally owned. Pop. 4,884.

CHEROKEE NATION v. GEORGIA, the historic case (1831) on the relations of the Indian tribes toward the United States government. (For the preliminary history, see CHEROKEE). The means taken by Georgia to oust the Cherokees were as follows: By six successive acts, from 20 Dec. 1828 to 22 Dec. 1830, Georgia laws and jurisdiction were extended over all inhabitants of the Cherokee territory, and resistance to her writs made indictable; Cherokee laws, usages, legislative assemblies and courts were abolished, and execution of their writs prohibited; Cherokees were declared incapable of testifying against or making contracts with white men, but the execution of the Cherokee laws against selling land to white men was punished as murder; their lands were ordered surveyed and distributed by lottery among the citizens of Georgia; their improvements and gold mines were confiscated; and white men were forbidden under penalty to enter their country, without a license from the governor and taking the oath of allegiance to Georgia. The Cherokees appealed at once (early in 1829) to President J. Q. Adams, to make good the government's treaty guarantees; but he, as his term was about to expire, left it to Jackson, who, as an old Indian fighter, sympathized with Georgia, refused to interfere and advised the Cherokees to submit or remove. Their next resort was to the Supreme Court, but the Georgians took care not to let suits in the State courts come to a decision, and so give opportunity for appeal. At length, however, a case was found. When the Georgia authority over the Cherokee country became operative in 1830 a Cherokee named Corntassel or George Tassels killed an officer serving a writ of ouster, and was sentenced to be hanged; a writ of error was obtained from the Supreme Court 12 Dec. 1830, citing the State to appear; the legislature instructed the State officials to ignore it, and the sentence was carried out. The Cherokees' council then applied to the Supreme Court for an injunction to prevent Georgia from exercising her laws within the Cherokee country; the State put in no appearance, and the case was decided from the arguments on the other side: These were: That the Supreme Court had jurisdiction over cases between States of the Union and foreign countries; and that the Cherokee Nation, by repeated acknowledgement of the United States in solemn treaties, was such a foreign country, sovereign and independent. Chief Justice John Marshall for the court — Story and Thompson dissenting — decided that they were not a foreign nation in the meaning of the Constitution,— since, for example, an attempt by any other foreign nation to form a connection with them, or to trespass on their land, would be held an invasion of the rights or territory of the United States; that they were a domestic or dependent nation, in a state of pupilage, their relation to the United States being like that of a ward to its guardian, that their title to their land was only that of occupancy, the United States succeeding to it whenever their own possession lapsed; that their appeal lay to the President; that the Supreme Court could not call out force to resist the extension of Georgia laws over territory claimed as its own; that it could pass on the title to land, upon suit properly brought, but this question was a political one.

A second case, though not cited under this head, properly belongs with this. Under the law restricting white men's entry into the Cherokee country, 10 missionaries and others were arrested and sentenced to four years' imprisonment, in September 1831. Eight were released on making submission; two refused; and one, Rev. Dr. Worcester, brought suit for a habeas corpus in the Supreme Court, which gave decision in March 1832, and to the lay mind appears to have reversed its former one. It held that all the acts of the Georgia legislature with respect to the Cherokees were unconstitutional and in violation of the treaties and

laws of the United States, and ordered the prisoner released as condemned on a void statute. The State refused to comply; but in place of waiting till the next term of the Supreme Court, to see if it would call on the United States authorities to enforce the decree, the prisoners made submission and were released. It is probable that Jackson's famous "John Marshall has made his decision — now let him enforce it," would have prevented them from regaining freedom till their term was up. Consult Cherokee Indians, 'Protest against land belonging to their nation being treated by the State of Georgia as its own' (Washington 1830); 'The relations existing between the nation and the State of Georgia' (Washington 1831); Ross, J., 'The Cherokees; their loyalty and suffering during the Civil War' (Philadelphia 1864).

CHERRY, the name of various species of trees and shrubs of the genus *Prunus*, family *Amygdalaceæ*, closely related to the almond, peach, apricot and plum, thus comprising one of the most important groups of fruits — the drupaceous or stone fruits. Cherries are characterized by white flowers, usually in umbel-like fascicles, or in racemes, and subglobular, mostly red, yellow or black fruits, without bloom, and containing nearly globular, smooth stones. Few of the native species have attracted horticultural attention except for ornamental purposes, but some, especially the wild black cherry (*P. serotina*), are highly prized as cabinet woods and for interior house-finishing.

The cultivated cherries have been derived almost wholly from two European species, *P. avium* and *P. cerasus*. The varieties of *P. avium* belong to three groups; hearts, heart-shaped, soft, light or dark, sweet fruits; bigarreaux; heart-shaped, firm, light or dark, sweet fruits; and dukes, light, somewhat acid fruits. Of these four groups the bigarreaux are the most important; they are largely grown in California and shipped to the Eastern markets. The hearts are somewhat grown for home on both the Atlantic and Pacific coasts, in Europe and in Australia. The varieties of *P. cerasus* are divided into amarelle (light-colored) and morello (dark-colored) groups. The morellos are the leading acid cherries and most popular in the eastern United States, especially in western New York, where they are largely canned for market, as well as shipped in the fresh state.

Besides these important species and their varieties, a few others have horticultural value, notably, *P. mahaleb*, a hardy, rather small European species, which is used as a propagating stock; *P. pennsylvanica*, the pin, wild red, or bird cherry; *P. besseyi* and *P. pumila*, the sand or dwarf cherries, which seem to grade into one another, the former producing sweet fruit, the latter acid, and which, being natives of the plains region, seem worthy of the attention of the hybridizer.

Cherries are propagated by budding upon either mazzard or mahaleb seedlings, the latter being in more general favor, especially in the West, because they are hardier, easier to grow, easier to bud and are freer from blight in the nursery. Sweet cherries succeed best upon well-drained light loams where the moisture is abundant but not excessive; sour kinds will stand heavier but not wet land; neither prove profitable upon very rich soils. The ground should be thoroughly and deeply plowed and harrowed; the sweet kinds, which are large spreading trees, set 25 to 30 feet apart, and the sour kinds 15 to 20 feet. The land should be kept clean by frequent cultivation until midsummer, when a clover crop should be sown. This must be turned under the following spring, and the land treated as before. Each year liberal applications of potash and phosphoric acid should be given and the trees protected from the attacks of insects and fungi by systematic spraying.

Two insects are most dreaded. One is the cherry aphis, which attacks the foliage in May. It is particularly troublesome upon the sweet kinds. Kerosene emulsion and fish-oil soap are each useful in controlling the pest. The other is the cherry slug, a shiny, dark-green "worm," the larva of a four-winged black fly. This eats the soft tissue of the leaves between the veins. It may be controlled with air-slaked lime or arsenites. See FUNGICIDE.

The most important diseases of the cherry are brown rot, leaf-blight and black knot, which are treated under PLUM. Consult Bailey, 'Cyclopedia of American Horticulture' (1914).

CHERRY, Wild, the bark of *Prunus serotina* collected in autumn. This is very extensively used in medicine as a vehicle basis, the syrup of the bark being used very extensively in cough remedies. It contains a small amount of hydrocyanic acid.

CHERRY-LAUREL (*Prunus laurocerasus*), a shrub closely allied to the common cherry, but having evergreen leaves. It was introduced into Great Britain in the 16th century, and is well known as an ornamental shrub. It yields the celebrated laurel-water. This is a powerful poison, the strength of which (like that of peach-kernels, bitter almonds, cherry-leaves, etc.) depends upon the presence of prussic acid. Laurel-water is obtained from the leaves and flowers, or the leaves only, by distillation. This shrub is often called the common laurel, another evergreen species being distinguished as the Portugal laurel; both are distinct from the true laurel.

CHERRY ORCHARD, The. Chekhov's realistic drama of Russian life, 'The Cherry Orchard,' was first performed, with enormous success, at the Moscow Art Theatre in 1903, only a few months before the death of the author. Chekhov's literary activity was coincident with the deep depression that in the eighties of the last century spread over the "Intelligentsia" of Russia, owing to the disappointing reaction following the war with Turkey. As a trained physician, Chekhov understands the diagnosis of this almost universal distemper and depicts it in his stories and plays. The title of 'The Cherry Orchard' has a double meaning: It refers both to the actual orchard on the destruction of which hinges the plot of the play, and to Russia itself. The people of the play represent various types of Russian character. Madame Ranevskaya through weakness and mental inertia sacrifices her great estate and its chief glory, the famous cherry orchard; her daughter Vavara is alike inactive; Lopakhin is the prosperous grandson of a former serf, into whose hands the estate passes;

the uncle Gayey is a type of the Russian who talks but who does nothing. The student Trofimov is a dreamer and idealist who sees what is the matter with Russia, and asserts that "in order to live in the present we must first redeem the past, and that can only be done by suffering, by strenuous, uninterrupted labor." With the faithful, unselfish old serf Fiers is contrasted the selfish young footman, Yasha. Though the play ends with the prospect of a gloomy future for Madame Ranevskaya and her daughter, Trofimov sees the vision of a regenerated Russia; "Mankind goes on to the highest truth, and to the biggest happiness possible on earth, and I go in the very van." But the poor old serf Fiers is left behind forgotten and soon to die, and the sound of axes is heard in the cherry orchard. In its sincerity, its truth, its subtle characterization, and its idealism, 'The Cherry Orchard' is representative of the best in modern Russian drama. It was first translated into English by George Calderon in 1912 and by Julius West in 1916.

NATHAN HASKELL DOLE.

CHERRY VALLEY, N. Y., village in Otsego County, 68 miles west of Albany, on the Delaware and Hudson Railroad. During the Revolutionary War the village was the scene of a massacre. On 11 Nov. 1778 Joseph Brant with 600 Indians and Walter Butler with 200 Tories and English attacked the little garrison here, killing 16 of the latter and 30 of the noncombatants, including women and children. Nearly all the buildings were burned and 71 prisoners were carried off and treated with great severity. Consult Halsey, 'The Old New York Frontier' (New York 1901).

CHERRY VALLEY MASSACRE was led by Lieut. Walter N. Butler, a Mohawk Valley Tory leader, son of the more famous Col. John Butler. He had been captured at German Flats in the summer of 1777, and sentenced to death as a spy, but, spared on the intercession of friends, he escaped. Lafayette, seeing the exposed situation of Cherry Valley, had fortified it with a blockhouse the preceding spring; and Col. Peter Gansevoort, an experienced officer of high reputation, solicited the command. For some reason, however, it was given to Col. Ichabod Alden, a Massachusetts officer, not used to Indian warfare. During the summer the inhabitants lived in the fort and went warily; but by November they had returned to their dwellings. On the 8th, Colonel Alden received a message through a friendly Indian that at a great meeting of Tories and Indians at Tioga it was resolved to attack the place; and the people begged to be permitted to take refuge in the fort again. Alden pooh-poohed the report as an idle Indian rumor, assured them that he would guard against a surprise and sent out scouting parties. The party that should have beaten up Butler's went to sleep by a campfire on the night of the 9th, and awoke as prisoners of the enemy. Butler obtaining a company of his father's rangers, induced Brant, the great Mohawk chief, to join him with a few hundred of his Indians, picked up a band of Senecas and other straggling Indians and Tories as he went on, and with about 700 men approached Cherry Valley. Securing from the prisoners, under threat of torture, all information as to the conditions there — as that the officers of the garrison lodged with families near the fort, instead of in it — the expedition camped about a mile southwest of the village on the night of the 10th. It snowed in the night, turning to rain in the morning. As the enemy approached under cover of the thick mist, an Indian fired on a stray settler and wounded him, but he escaped and warned the colonel, who thought the assailant only a straggling Indian, and paid no attention to the matter. The rangers stopped near the village to examine their guns, and the Indians sprang forward, the ferocious Senecas in advance, under their chief, Sayenqueraghta. In the massacre that ensued, 32 settlers, mostly women and children, the colonel and 15 soldiers, were slain; 30 to 40 prisoners were taken, also nearly all women and children; and the village was reduced to ashes. Most of the prisoners were released the next day, and sent back to effect an exchange for Butler's mother and younger brothers and sisters, in the power of the Americans.

CHERRYVALE, Kan., city in Montgomery County, 160 miles southwest of Kansas City, on the Atchison, Topeka and Santa Fé and the Saint Louis and San Francisco railroads. Brickmaking, oil refining, zinc smelting, glassmaking and iron founding are the principal industries. There are deposits of oil and gas nearby. The city has a Carnegie library. It was settled in 1870 and incorporated nine years later. It is under the commission form of government and owns its waterworks. Pop. 4,304.

CHERSO, kĕr'sō, a long, narrow island, in the northern Adriatic, belonging to Austria, yielding wine, olives and other fruits. It is situated on the Gulf of Quarnero, between Veglia and the mainland, and forms part of Istria. It is about 35 miles long, and the area is 105 square miles. The town of the same name stands on the west coast, and has a population of about 4,725. Pop. of island about 10,180.

CHERSONESUS, kĕr-sō-nē'sŭs (Greek, a peninsula). This name has been given to several peninsulas, as (1) the Cimbrian Chersonesus, now Jutland; (2) the Taurian Chersonesus, the peninsula formed by the Black Sea and the Sea of Azov — the Crimea; (3) the Thracian Chersonesus, the great peninsula in Thrace, now the peninsula of the Dardanelles; (4) the Golden Chersonesus, in India beyond the Ganges, supposed to be the Malay Peninsula.

CHERT, a crypto-crystalline (not visibly crystalline) variety of quartz closely related to flint, but less translucent and having a more splintery fracture. In geology the term is applied to a considerable range of siliceous rocks, from the impure flints largely formed from the siliceous remains of organisms, sponges and diatoms, found in limestones and other stratified rocks, to the jasperated quartz formed by the alteration of limestones or limy sandstones. Cherts of this last type grade into jasper. See FLINT; JASPER; QUARTZ.

CHERTSEY, chĕs'sĭ or chĕrt'sĭ, England, town in the county of Surrey, 22½ miles southwest of London, on the London and Southwestern Railway, is pleasantly situated on the right bank of the Thames, over which there is

a handsome bridge, connecting with the north or Middlesex side of the river. The houses are mostly of brick, and in general well built. The church of Saint Peter has a square embattled tower, and contains a tablet to the memory of Charles James Fox. There was here formerly a great monastery of the Benedictine order, founded in 666, of which the ground plan only is now traceable. The chief industries are manufacturing iron, engineering, boat- and steam-launch building and carriage building, and there is a large trade in flour, malt and agricultural produce for the London market. Pop. 13,816.

CHERUB (plural, cherubim), a celestial spirit, which, in the angelic hierarchy, is placed next in order to the seraphim. All the several descriptions which the Scripture gives us of cherubim differ from one another, as they are described in the shapes of men, eagles, oxen, lions and in a composition of all these figures put together. The hieroglyphical representations in the embroidery upon the curtains of the tabernacle were called by Moses (Ex. xxvi, 1) cherubim of cunning work.

CHERUB, The. See ESSEX, PHŒBE AND CHERUB.

CHERUBINI, kā-roo-bē'nē, **Maria Luigi Carlo Zenobi Salvatore,** Italian composer: b. Florence, 14 Sept. 1760; d. Paris, 15 March 1842. In 1773 he produced a mass, which, with other of his compositions, attracted the attention of the Grand Duke Leopold, who enabled him to become a pupil of Sarti of Bologna, under whom he studied from 1778 to 1782. As early as 1780 he produced his first opera, 'Quinto Fabio,' at Alessandria, and in 1784 he had already produced eight operas in the theatres of Italy. In 1785 he composed for the London Italian opera 'La finta Principessa' and 'Giulio Sabino' (1786); in 1788 at Turin his 'Ifigenia in Aulide'; and in the winter of the same year he brought out his 'Démophon'; and in 1791 his 'Lodoïska,' at Paris. The latter opera established his fame, and was followed by 'Elisa' (1794); 'Médée' (1797); 'L'hôtellerie Portugaise' (1798); 'Les deux journées' (1800); 'Anacréon' (1803); and his ballet of 'Achilles at Scyros' (1804). In 1806 he produced 'Faniska' at Vienna; in 1809, 'Pimmalione' at Paris; in 1813, 'Les Abencerrages'; in 1814, 'Bayard à Mézières'; in 1821 'Blanche de Provence'; and in 1833, 'Ali Baba.' He excelled in sacred music. His celebrated Mass in F for three voices, his grand 'Requiem,' his 'Messi Sacrie,' are the noblest monuments of his genius. Haydn and Beethoven pronounced him the greatest sacred composer of the age. In 1822 he became director of the *Conservatoire* of Paris, with which he had been connected from the date of its foundation in 1795, and which is greatly indebted to him for its prosperity. The most important of Cherubini's literary works is one on counterpoint — which is a standard publication. He was enthusiastically devoted to his profession, and his independence as an artist frequently manifested itself. Napoleon for a long time could not forgive him, because on one occasion, when he rudely contradicted him on some point of music, the artist replied: "Citizen Bonaparte, in the art of war you are pre-eminent, but you should leave music to those who understand it." Consult Bellasis, E., 'Cherubini; Memorials, Illustrative of his Life' (London 1874); Berlioz, 'Mémoires' (Paris 1878); Wittmann, M. E., 'Cherubini' (Leipzig 1895).

CHERUSCI, kē-rŭs'sē, the most celebrated of all the German tribes. It is difficult to determine their exact position, owing to the fact that ancient writers sometimes confound the national league formed by the Cherusci with the tribe, properly so called. It seems probable, however, that the tribe was situated in that part of Germany lying between the Weser and the Elbe, and having the Harz Mountains on the north and the Sudetic Range on the south. This tribe was known to the Romans before 50 B.C. and it is mentioned by Cæsar as a people of equal importance with the Suevi. Their territory was first entered by the Romans under Drusus, the stepson of Augustus; and a year or two later they entered into an alliance with the Romans, and served in their armies. But when Varus attempted to make them tributary to Rome, and subject them to the Roman laws, they formed a confederation with many smaller tribes, and having decoyed Varus into the forest of Teutoburg, destroyed his whole army in a battle which lasted three days, and in which he himself was slain (9 A.D.). Upon this the Cherusci became the chief object of the attacks of the Romans. Germanicus, victorious over the Marsi and Chatti, marched against the Cherusci, whose leaders, Segestus and Arminius (the latter of whom had carried off the daughter of the former), were at war with each other. Segestus, pressed by Arminius, called Germanicus to his aid, who delivered him, indeed, from his danger, but was obliged to return after several campaigns without having obtained any permanent advantages. In the end the Cherusci were overcome by the Chatti in the second half of the 1st century of our era; but this seems to have been owing more to internal dissensions among themselves than to any natural superiority in their opponents. Before the end of the 4th century they appear as members of the great confederation of the Franks, and after that they are lost sight of.

CHERVIL, a popular name for several plants of the family *Apiaceæ*. Leaf chervil or salad chervil (*Anthriscus cerefolium*) is an annual herb native to southern Europe, and has long been cultivated in Europe, but very little in America, for its sweet-scented compound leaves, which are used like parsley for garnishing, flavoring soups, stews, etc., and as a pot-herb. It is of easy cultivation and yields its leaves in about eight weeks from sowing the seed. In some localities it has escaped from the gardens and has become a weed. Turnip-rooted or tuberous chervil (*Chærophyllum bulbosum*) is a biennial or annual herb native to southern Europe and has long been cultivated for its small, grayish or blackish, carrot-like roots, which are eaten either like beets or as a flavoring in soups, stews, etc. Since its seeds lose their vitality very quickly, they should be sown in the autumn, or else stratified until spring. If sown in the fall they need not be expected to appear before spring. Except as just mentioned, the cultivation of tuberous-rooted chervil resembles that of carrots.

CHESAPEAKE BAY, in Maryland and Virginia, and dividing the former State into two parts, is the largest inlet on the American coast of the United States, being 200 miles long and from 4 to 40 broad. Its entrance, 12 miles wide, has on the north Cape Charles, and on the south Cape Henry, both promontories being in Virginia. The bay has numerous arms, which receive many navigable rivers such as the Susquehanna on the north, the Potomac, Rappahannock and York on the west, and the James on the southwest. Unlike the shallow sounds toward the south, this network of gulfs and estuaries, with its noble feeders, affords depth of water for ships of any burden, virtually carrying the ocean up to the wharves of Baltimore and Norfolk and the arsenal of Washington. Extensive oyster beds are to be found in this bay.

CHESAPEAKE BAY DOG. See Dog.

CHESAPEAKE AND DELAWARE CANAL, connecting Chesapeake and Delaware bays. It is 14 miles long, 9 feet deep. The cost of construction was $4,000,000. See CANALS.

CHESAPEAKE AND LEOPARD, Affair of the, 22 June 1807. The *Chesapeake* was a 40 gun frigate destined to relieve the *Constitution* in the Mediterranean; Capt. James Barron was to go out in her as commander of the Mediterranean squadron. She had been refitted at the Washington navy-yard, and made final preparations at Norfolk, reporting ready for service on 19 June. On the 22d she got under way, but expecting no attack from powers at peace with this country, was in no shape for immediate action, and being four months behind time, could not wait. The gun deck was obstructed with various lumber, sick seamen were lying on the upper deck, the cables were not stowed away, the powder-horns were not filled and the crew was raw and not exercised at the guns. At this time, in the heart of the Napoleonic wars, the high wages and relatively safe employ of the American merchant and even naval service, with the rights of American citizenship immediately obtained, raised the normal rate of desertion from the British navy so much that its officers were much embarrassed and greatly incensed; and Great Britain claimed, as for many years afterward, the right of searching neutrals for deserters and contraband. At the same time, her press-gangs crimped for service any strays who could be caught, of any nationality, and rarely gave any redress. Early in 1807 a British fleet lay off Norfolk watching to intercept some French frigates in the Chesapeake; and a boat's crew deserted bodily and escaped to Norfolk. The captain was told that they had enlisted on the *Chesapeake,*—which was true of only one, and he under an assumed name; and meeting the latter and another deserter in the streets of Norfolk, was defied. Another vessel, the *Melampus,* reported three deserters gone to the *Chesapeake,* but it was proved that they were native Americans illegally pressed. Admiral Berkeley, at Halifax, on complaint of his officers, ordered any of his vessels to overhaul and search the *Chesapeake* on meeting her outside the United States jurisdiction. The order was carried out by the 52-gun flagship, *Leopard,* Captain Humphreys, after consulting with the local commandant at Lynnhaven, followed the *Chesapeake* out beyond Cape Henry, hailed her, and sent a boat with a copy of Berkeley's order. Barron, who believed that he had no deserters aboard except the *Melampus',* which were not really such, honestly denied having any, but refused the right to search; the messenger lieutenant at once left and within five minutes the *Leopard* came closer, and Humphreys announced that he should carry out his orders. Barron at once called his men to quarters, and did everything that skill, coolness and courage could do to prepare for action, but the *Leopard* almost at once poured one whole broadside into the *Chesapeake,* and then two more in rapid succession, without the possibility of her opponent replying. Three of the latter's men were killed, Barron and 17 others wounded, and it was certain that the vessel would be sunk in a short time if the fire kept up, and Barron, to stop a useless massacre, struck his flag. The one English deserter was hunted out and hanged, the three Americans taken and imprisoned. The mass of the country was on fire with indignation; the extreme Federalists at first justified the English course, but were compelled by public feeling to exhibit some patriotism. Even Jefferson, whose unwise course had brought on the catastrophe, interdicted British cruisers from American ports, and demanded disavowal and reparation from Great Britain, which were not given; but he did nothing to prevent the recurrence of such outrages. The unfortunate Barron, who had behaved like a brave man and good officer, and whose instructions had bound him to do nothing to bring on collisions, was made the scapegoat of the popular fury. His own captain screened himself by accusing him, and a court-martial on board his own vessel from 4–8 Jan. 1808, Capt. John Rodgers president, after acquitting him of all blame in every respect but one, found him guilty in not preparing for action as soon as he read Admiral Berkeley's order, and sentenced him to five years' suspension without pay or emoluments. The gross injustice of this is now admitted. One of the judges was Stephen Decatur (q.v.), who never ceased reflecting on Barron till the latter challenged and killed him.

CHESAPEAKE & OHIO RAILWAY, The. The road had its origin in the charter of a company by the legislature of Virginia on 18 Feb. 1836, to build a branch from the Richmond, Fredericksburg & Potomac Railroad, through the county of Louisa, Va., and was styled The Louisa Railroad. The road was built under this charter from Hanover Junction (now Doswell), on the Richmond, Fredericksburg & Potomac Railroad, 26 miles from Richmond, to Louisa Court House, 34.7 miles, and was operated by the Richmond, Fredericksburg & Potomac Railroad Company. Subsequently it was extended in short sections at various times under several acts of the legislature to Jackson River, 10 miles east of Covington, Va., on the west, and to the city of Richmond on the east, between which points it was being operated in the spring of 1861. Prior to this time, however, in 1850, its name was changed to "Virginia Central Railroad Company."

In 1853, the State authorized the construc-

tion of the Covington & Ohio Railroad, from Covington, Va., to the Ohio River; work was stopped by the Civil War after about $3,000,000 had been expended by the State. When the war was over, the State having been dismembered, Virginia and West Virginia united in efforts which resulted in combining the Virginia Central and the Covington & Ohio railroad companies, in 1868, under the name of Chesapeake & Ohio Railroad Company and the completion of the road westward to Huntington, on the Ohio River, in West Virginia, in the year 1873.

In 1878 the road was sold under foreclosure and reorganized as The Chesapeake & Ohio Railway Company.

Under legislative authority the road was extended from Richmond to Newport News, in 1880, and to the government reservation at Fort Monroe, in 1882. In the meantime it had been extended westward from Huntington to the Big Sandy River, the western boundary of West Virginia, and established connection with the Elizabethtown, Lexington & Big Sandy Railroad Company, in October 1880, opening up through service to Lexington, Cincinnati and the West and South. In 1888 the road was again reorganized and secured control, through stock ownership of the Maysville & Big Sandy Railroad Company and the new railway bridge at Cincinnati, giving it a direct through line from tidewater to Cincinnati, Ohio.

In 1892, the Elizabethtown, Lexington & Big Sandy Railroad Company, extending to Lexington, Ky., was acquired, and in 1895 through service to Louisville, Ky., was established by an agreement with the Louisville & Nashville for the joint use of its line from Lexington to Louisville. In the same year The Chesapeake & Ohio Railway Company became owner jointly with the Cleveland, Cincinnati, Chicago & Saint Louis Railway Company of the Louisville & Jeffersonville Bridge Company, giving entrance into Jeffersonville, Ind., and connection with the Big Four Railway northward.

The Richmond & Allegheny Railroad located in the James River Valley, 231 miles long, between Richmond and Clifton Forge, Va., was acquired in January, 1890, affording a low grade route from the Ohio River to Newport News. Entrance into Washington, D. C., was secured in 1891, under agreements for the joint use of tracks of the Richmond & Danville Railroad Company (now the Southern Railway Company) and the Washington Southern Railway Company.

A number of subsidiary lines and branches have been built penetrating mineral and timber regions; among them are the Big Sandy Railway, Kentucky, the Guyandot Valley Branch, Coal River Railway, Cabin Creek Branch, Point Creek Branch, Gauley Branch, Loup Creek Branch, Piney Creek Branch, the Greenbrier Railway, in West Virginia, and the Warm Springs Valley Branch, Craig Valley Branch and Buckingham Branch, in Virginia.

The eastern termini of this railway are Washington, D. C., Newport News, Fort Monroe and (by ferry transfer) Norfolk, Va. From these places it extends westward, passing through the agricultural, tidewater and Piedmont regions, crossing the Blue Ridge Mountains and the Shenandoah Valley of Virginia, thence through the iron ore regions, across the Allegheny Mountains to and through the coal and timber fields of West Virginia, to the Ohio River, at Huntington. One of its lines continues on along the Ohio River within the north boundary line of Kentucky to Cincinnati, Ohio, and another extends from Ashland, Ky., through the Blue Grass region to Lexington and Louisville, Ky., and Jefferson, Ind.

As of 30 June 1916, the company's lines and sidings comprised 3,992.7 miles of track; the mileage operated, exclusive of second track and sidings, was 2,385.6, of which 2,123.5 miles are owned, 37.9 miles are leased and 224.2 miles used jointly with other railway companies. Steel rails 125 and 100 pounds to the yard are the standard in use. Facilities for handling traffic are excellent in every respect. It is essentially a low grade line from Cincinnati to the coast. Crossing the mountains the maximum grade ascending eastward in the direction of heavy traffic is only 30 feet to the mile.

In the fiscal year 1916 the number of revenue tons of freight carried one mile was 10,296,523,340; the tonnage of coal handled was 26,979,519; and passenger miles run were 281,348,788. In the same year the equipment of the road consisted of the following: Locomotives, 827; freight cars, all classes, 44,770; passenger, baggage and express cars, 370. In 1894–95 the equipment was as follows: Locomotives, 355; freight cars, all classes, 13,808; passenger, baggage and express cars, 212. The increase in freight car and locomotive capacity is greater than appears from their number, as the average capacity of freight cars increased from 25.1 tons each to 49.7 tons, and the locomotives are of much greater power.

The capital stock outstanding (1916) was $62,792,600, and the total bonded indebtedness was $181,535,169.54. The gross earnings for year ending 30 June 1916 were: $48,239,012.10, operating expenses, $31,789,179.22; net earnings, $16,449,832.88; taxes, $1,587,407.08; other income, $191,989.10; fixed charges, $8,175,199.15; net income, $6,879,215.84.

CHESAPEAKE AND SHANNON, Battle of, 1 June 1813. In the War of 1812, the former vessel (See CHESAPEAKE AND LEOPARD, AFFAIR OF THE), cruised to no purpose from December 1812 till April 1813, and arrived at Boston 9 April. Her captain, Evans, left her on account of ill health, and about the middle of May was replaced by Capt. James Lawrence, famous for the brilliant victory of the *Hornet* over the *Peacock*. He accepted against his will; nearly all the officers and crew were new, and the latter second-rate, totally untrained and sulky over questions of prize money. On 25 May Captain Broke of the *Shannon*, lying outside, sent away his consort, the *Tenedos*, to have a fair chance to fight the *Chesapeake* alone, and repeatedly urged Lawrence to arrange a duel between the ships. In theory they were evenly matched; they were of almost exactly the same length; the *Chesapeake* now carried 50 guns, the *Shannon* 52; the *Chesapeake* had 379 officers and crew against the *Shannon's* 330, but the latter had been trained for seven years under Broke himself, kept in constant artillery and other practice, and was a thoroughly disciplined fighting machine, men used to each other and the officers. On 1 June, however, Lawrence, whose experience had made

him despise British skill and courage alike, sailed out to meet his enemy, and at 5.30 P.M. they engaged. After a couple of broadsides, the *Shannon's* shot cut the *Chesapeake's* stays, and the latter drifted helplessly stern foremost toward her adversary. There was no salvation but to make sail forward or to board, and both were impossible. The *Shannon's* broadsides and the musketry fire from her tops swept the *Chesapeake* diagonally from stem to stern, without the latter being able to fire a shot in reply, beating in the stern ports and killing or wounding every man on the quarter-deck and the after part, including the men at the wheel. Just before the vessels struck, Lawrence ordered up his boarding party; but almost at the same instant he fell mortally wounded by a musket ball, and was carried below. Not a living person was on the quarter-deck, and Broke, with 50 boarders, rushed on board unresisted just as the vessels parted. He was in deadly peril from his own guns, which killed his first lieutenant as the latter pulled down the American flag, and so fierce was the resistance from that 30 or so of the American crew who had rallied at the forecastle, that 37 of the boarding party were killed or wounded, including Broke himself. Had the rest of the crew shown even decent pluck, not one of the British would have escaped; but the upper party, heavily overmatched, were killed or driven below, and though the dying Lawrence called out from the cockpit, "Don't give up the ship! Blow her up!" the remainder refused to go above, and surrendered. The *Chesapeake* lost 61 killed and 85 wounded; the *Shannon* 33 killed and 50 wounded. The former was towed into Halifax as a prize, turned into a British war vessel and in 1820 was broken up. Lawrence died four days after the battle.

CHESAPEAKE STAGE. The rocks of the Chesapeake Stage, a younger Miocene of the Atlantic coast, are clays and marls in the north, and marls and limestones in the south. They differ chiefly from the older Miocene, or Chattahoochee and Chipiola Stages, now called Oligocene, in the character of the fossils, particularly in the north; these fossils indicating that the climate was much colder in the newer than in the old Miocene. This change of climate is believed to have been due to a change in the direction of the Gulf Stream, which flowed farther from the coast than before. The stage is well developed at Duplin County, N. C., at Yorktown, Va., and along rivers in Maryland. Strata of this age are found at Martha's Vineyard, Mass., and in Texas. See MIOCENE SERIES; TERTIARY SYSTEM.

CHESELDEN, chĕs'ĕl-dĕn, **William,** English surgeon and anatomist: b. Somerby, Leicestershire, 1688; d. Bath, 10 April 1752. At the age of 22 he began to give lectures on anatomy, and in 1711 he was chosen F.R.S. In 1713 he published a treatise on the 'Anatomy of the Human Body,' long a favorite manual of the science. He continued to read his lectures for more than 20 years, during which he gradually rose to the head of his profession. In 1723 he published a 'Treatise on the High Operation for the Stone.' In 1733 was published his 'Osteographia, or Anatomy of the Bones.' Cheselden obtained in 1737 the appointment of chief surgeon to Chelsea Hospital, a post he held till his death.

CHESHIRE, chĕsh'hĕr, **Joseph Blount,** American Protestant Episcopal bishop: b. Tarboro, N. C., 27 March 1850. He was graduated at Trinity College in 1869, and practised law from 1872 to 1878. He was ordained to the priesthood in 1880, and, after holding various rectorships, became bishop of North Carolina in 1893. He received the degree of D.D. from the University of North Carolina in 1890 and from the University of the South in 1894. He is the author of a number of monographs on local, State, and Church history, and of 'History of the Protestant Episcopal Church in the Confederate States' (1911).

CHESHIRE, or **CHESTER,** England, a maritime county, bounded by seven other counties in England and Wales, by the estuaries of the Dee and Mersey and by the Irish Sea. Its area is 1,026 square miles, of which the greater part is under cultivation. The surface is generally level, the soil mostly a rich reddish loam variously clayey or sandy. There is some of the finest pasture land in England; and cheese, the main product of the Cheshire farmer, is made in great quantities. Extensive tracts of land are cultivated as market-gardens, the produce being sent to Liverpool, Manchester and other cities. Minerals abound, especially rock-salt and coal, which are extensively worked. Cotton manufacture is carried on at Stockport, Stalybridge and in the northeastern district, shipbuilding at Birkenhead and other places. There are numerous railroad lines and a splendid system of canals, among them the famous Manchester Ship Canal. The principal towns are Chester, the county town, Macclesfield, Stockport, Birkenhead and Stalybridge. The various divisions of the county return eight members to the House of Commons. Pop. 954,779.

CHESHUNT, chĕs'ĕnt, England, town in Hertfordshire, seven miles south of Hertford, and 14 miles north of London, on the Lea. From 1792 to 1905 it was the seat of Cheshunt Theological College. Consult 'Cheshunt College' (London 1868). Pop. 12,954.

CHESLEY, Mary Russell, Canadian social reformer: b. Dartmouth, Nova Scotia, 1847. She was educated in her native place and early became interested in social problems, notably in the suppression of the liquor traffic. She became president of the Women's Christian Temperance Union. In 1891 the Society petitioned the Nova Scotia legislature for the political enfranchisement of women and when the petition was denied Miss Chesley became very prominent in the movement, making a noteworthy reply to an attack on woman suffrage by Attorney-General Longley of Nova Scotia. She has written 'The Mission of Women' (1895); 'The Delusion of Militarism' (1909) and many articles on woman suffrage and prohibition.

CHESNEY, chĕs'nĭ, **Charles Cornwallis,** English soldier and author: b. 29 Sept. 1826; d. 19 March 1876. He was a well-known military engineer, but was still better known as a writer on military themes, publishing 'Campaigns in Virginia' (1863); 'Waterloo Lectures' (1868); 'Military Biographies' (1870). The last-named volume contained essays on Generals Grant and Lee. He was a nephew of F. R. Chesney (q.v.).

CHESNEY, Francis Rawdon, English explorer: b. Annalong, County Down, Ireland, 1789; d. Mourne, 30 Jan. 1872. He was gazetted to the Royal Artillery in 1805. In 1830 he inspected the route for a Suez canal which he proved to be practicable. His first exploration of the route to India, by way of Syria and the Euphrates, was made in 1831, and he made three other voyages with the same object. The idea was taken up by the government, who made a grant of £20,000 after his first expedition, but owing to the opposition of Russia it was never brought to a practical issue. He commanded the artillery at Hongkong from 1843 to 1847. In 1850 he published his 'Expedition for the Survey of the Rivers Euphrates and Tigris,' and in 1868 a 'Narrative of the Euphrates Expedition.' Consult 'Life,' edited by Lane-Poole (1885).

CHESNEY, Sir George Tomkyns, English writer: b. 1830; d. 1895. He was a colonel in the army, and later a general and K.C.B. and sat in the House of Commons for Oxford from 1892–95. But he will be longest remembered for his remarkable realistic 'Battle of Dorking' (q.v.) (1871); and his brilliant novel, 'The Private Secretary' (1881).

CHESNUT, Victor King, American botanist: b. Nevada City, Cal., 28 June 1867. He was graduated at the University of California in 1890 and pursued post-graduate work at the University of Chicago and at Columbia University. In 1894 he became assistant botanist in charge of poisonous plant investigation, carried on by the United States Department of Agriculture. From 1904 to 1907 he was chemist of the Montana Experiment Station. In 1907 he became assistant chemist in the division of drugs, bureau of chemistry, United States Department of Agriculture. He has written 'Principal Poisonous Plants in the United States' (1898); 'Thirty Poisonous Plants of the United States'; and 'Preliminary Catalogue of Plants Poisonous to Stock' (1898); 'Plants used by the Indians of Mendocino County, California' (1902); 'The National Museum in Drug Research' (1908); 'Determination of Pepsin in Liquids' (1913).

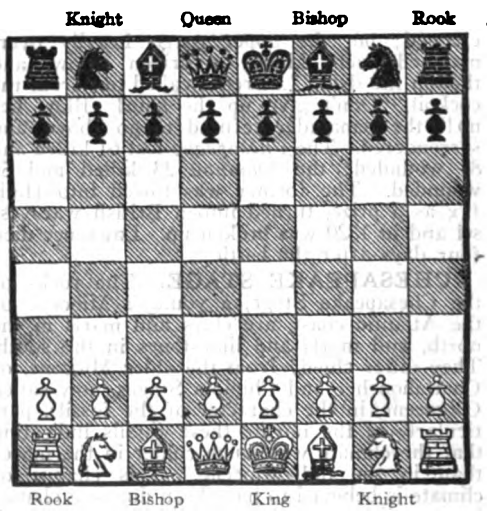
CHESNUTT, Charles Waddell, American author: b. Cleveland, Ohio, 20 June 1858. While still a child he was taken to North Carolina, where he was educated, becoming subsequently principal of the State Normal School at Fayetteville. He removed to New York and entered journalism temporarily, returning later to Cleveland, where he was admitted to the bar in 1887. He has written 'The Conjure Woman' (1899); 'The Wife of His Youth and Other Stories' (1899); 'Life of Frederick Douglass' (in 'Beacon Biographies') (1899); 'The House Behind the Cedars' (1900); and 'The Marrow of Tradition' (1901); and 'The Colonel's Dream' (1905).

CHESS. Chess is a game of strategy consisting of regularly developed attack and defense with a definite objective toward which all operations are directed and to which they are subordinated. It may aspire to the dignity of both an art and a science. It cultivates both memory and reason and what may be called "geometrical sense" and at the same time is one of the most fascinating recreations. Steinitz, Zuckertort and Blackburne, noted masters of the game, have developed such intellectual powers, in play, that they have not infrequently engaged successfully in as many as 14 games simultaneously, without looking at the board. With 32 men on each board at the opening, and 64 squares on each board to cover, this is surely remarkable.

Chess is a very ancient game, probably long antedating any extant records. Although the first authentic literature on chess came from the Arabs and Hebrews, in Granada, about the 11th century, it is quite clear that it was already widespread among Mohammedan nations. It is probable that it originated in China, and passed into India, where it was known as "Chartarunga" and was played by four persons, and that from India it spread to Persia about the beginning of the 7th century of our era. It was then adopted by the Arab conquerors of that country and introduced into Europe.

The accompanying engraving shows the pieces, which are manufactured in variously modified forms, in position at the opening of play, and the board upon which the game is played.

CHESS BOARD



The board is divided into 64 squares, and the opposing forces occupy the limits of these squares.

The four squares counting from the king's square to the right are called the king's side, and the four squares from the queen to the left, the queen's side of board. The squares counting from the white to the black are called files, and in a direction perpendicular to the files, rows. For purposes of description, each square on the board is designated in two ways, in accordance with its relation to the position of the black or white rear men, as originally set in the preceding diagram. Each file is named after the rear row piece standing thereon. The rows are numbered consecutively across the board. If white plays, the position of the white piece is designated by naming the file on which it stands, while the row is numbered from the white side; similarly, if black plays, the row is numbered from the black side.

The rear men are named as indicated in the diagram and are known as pieces. The front row men are called pawns. Where there are two pieces of the same name, they are distinguished as king's or queen's pieces, throughout the game, in accordance with their greater nearness to the king or queen, as originally set.

In notation the abbreviations are as follows:

King	K.	Queen	Q.
King's bishop	K. B.	Queen's bishop	Q. B.
King's knight	K. Kt.	Queen's knight	Q. Kt.
King's rook	K. R.	Queen's rook	Q. R.
and Pawns	P.		

The movements of the pawns and pieces are as follows: Each pawn moves straight forward one square at a time. On its first move, however, it may, at the option of the player, advance two squares, if there is no piece in the way. It cannot take an opposing piece directly in front. It captures an opposing piece only when it is one square diagonally to the right or the left. The captured piece is then removed from the board, and the capturing pawn placed on the square. All other chess men capture an opposing piece by stopping on the square it occupies, as they move. Should a pawn, in moving two squares, pass the diagonal of an opponent's pawn, the opponent may "take it in passing" by moving on to the square it crossed. Should a pawn succeed in reaching the eighth row, the player may replace it by any piece he desires.

The rook may move in a straight line up or down the file, or row, any number of squares at the option of the player unless obstructed by his own or an opposing man. If the obstruction is by an opposing man it may be captured or not, as the player wills.

The bishop moves diagonally in any one direction and any distance over the board, unless similarly limited, when it has a similar right of capture.

The knight has a peculiar move over two squares, one diagonally and the other straight, leaping over the intermediate square whether occupied or not. Thus, in the diagram the knight on K.Kt. square is at liberty to move to KR3 or KB3 — leaping over the pawns and if he chooses, may return to Kt. square at the next move. He cannot leap into a square which is occupied by one of his own men, but if occupied by an opposing man, he may capture him.

The queen combines the rook and bishop moves in the sense that she may either traverse the board in a straight or a diagonal line, any distance at the option of the player so far as the same is unobstructed, with the right to capture any enemy's pawn or piece in her way, as above indicated.

The king moves in any direction one square. Once during the game, he has, however, a right, termed Castling. This is effected by placing the king's or queen's rook — as the case may be — next to the king and causing the king to leap over the rook to the square on the other side. This can only be done if there are no pawns or pieces intervening between the king and the rook and only in the event of the king and the rook used in castling not having theretofore been moved, and also that the king does not traverse a square which an opposing piece or pawn can reach in one move.

When either king in the course of the game is brought into a position where he could be captured by an opposing piece, his player must be notified by the word "check." He must then either be moved out of the "check" position, the hostile piece taken or some piece interposed to annul the "check." Should none of these resources be available, he is "checkmate" and the game is lost. He is not permitted to move into "check," and if no other piece on his side can be moved, and a move into "check" is the only possible move, the situation is one of "stale mate" and the game is a "draw." To put the opposing king into a position of "checkmate" is the sole object of chess strategy. Rapid "checkmate" is often illustrated by the following game:

White	Black
1. P—K4	1. P—K4
2. K. B.—B4	2. K. B.—B4
3. Q—R5	3. K. Kt.—B3
4. Q takes B. P. (checkmate)	

and while easily frustrated, may be studied by the beginner to see how variously "checkmate" may be avoided.

As in warfare, chess strategy consists in rapid mobilization against the vital points of your enemy's defense and the opening moves are directed toward securing open lines of communication in the rear, with a well-supported attack. A few simple points in this connection should be noted by the beginner. Seek as early as possible to form some definite plan of attack. In developing your plan make the advantageous capture of enemy pieces subsidiary to that end and not a principal object. *This will be almost impossible at first* but always keep it before you as an end to be attained. Never study your own move until you have first sought to divine the purpose of your opponent's move. On the other hand "camouflage" your own purpose by the avoidance of a too *obvious* scrutiny of the part of the board that particularly interests you. Remember that a purposeless move, or move into a position from which your adversary may easily drive you, is a step toward loss of the game. In this connection, note that it is usually unwise to bring out your major pieces early in the game. Beginners are usually too fond of early and frequent play with the queen. It is only against inferior players that such tactics are fruitful. The pawns should support one another and not become isolated. Two or three are usually retained in a position to protect the king, after castling, which is often done rather early in the game in order to bring out the rook and protect the king. Use your knights and king's bishop in developing an early attack. A knight in an advanced position from which it cannot easily be driven is very hampering to your opponent and gives the opportunity for diverse strategy. Avoid placing your knight on the rook's file as it loses half its power thereby. The bishop is often more valuable than a knight on an open board. In considering the exchange of a knight for a bishop, this detail may determine, in the absence of other reasons. Do not develop simple "fondness" for a piece, as beginners often do, refusing an exchange to the loss of position. The "openings" in chess have been so carefully studied and each move, with its possible answers, has been so carefully

analyzed, that the beginner cannot do better than study some of the more prominent ones, in order to obtain an early acquaintance with its tactics and strategy. He should also carefully play over games by the great masters. Many of these have been annotated by prominent players, and their comments, while at first hard to follow, will gradually become more and more illuminating, as the student's "chess sense" develops. Chess problems will also develop the player's ability.

There are two classes of chess openings, the gambit, in which one or more pieces are sacrificed in order to obtain a strong attack, and those without any sacrifice. While theoretically the gambit is a lost game, with perfect play on your opponent's part, it is practically very safe and usually develops a more fascinating situation. Lately chess masters have rather avoided the gambit in matches, but with it the game is full of varying interest and the policy has been a loss to chess. The gambit may be either on the king's or queen's side. The former offers a more exciting game.

The following game between Anderssen (white) and Kieseritzki (black) illustrates the king's bishop's gambit.

White	Black
Anderssen	Kieseritzki
1. P—K4	1. P—K4
2. P—KB4	2. P takes P
3. B—B4	3. Q—R5 (ch)
4. K—Bsq	4. P—QKt4
5. B takes KtP	5. Kt—KB3
6. Kt—KB3	6. Q—R3
7. P—Q3	7. Kt—R4
8. Kt—R4	8. Q—Kt4
9. Kt—B5	9. P—QB3
10. P—K Kt4	10. Kt—B3
11. R—Kt sq.	11. P takes B
12. P—K R4	12. Q—Kt3
13. P—R5	13. Q—Kt4
14. Q—B3	14. Kt—Kt sq.
15. B takes P	15. Q—B3
16. Kt—B3	16. B—B4
17. Kt—Q5	17. Q takes KtP
18. B—Q6	18. Q takes R (ch)
19. K—K2	19. B takes R
20. P—K5	20. Kt—QR3

White mates in three moves. The Muzio gambit with its double sacrifices affords an intensely instructive opening. It develops as follows:

White	Black
1. P—K4	1. P—K4
2. P—KB4	2. P takes P.
3. Kt—B3	3. P—KKt4
4. B—B4	4. P—K Kt5
5. Castles	5. P takes Kt
6. Q takes P	6. Q—B3

An old Scotch gambit known as the Evan's gambit not often played now, on account of a defense revived by Steinitz, but not given here, is also very instructive for the beginner.

White	Black
1. P—K 4	1. P—K4
2. KKt—B3	2. QKt.—B3
3. B—B4	3. B—B4
4. P—Q Kt4	4. B takes Kt.P.
5. P—B3	5. B—B4
6. P—Q4	6. P takes P
7. Castles	7. P—Q3
8. P takes P	8. B—Kt3

If on the fourth move above the game should proceed 4. P — Q3. 4. P — Q3 it then develops into the conservative Giuoco Piano opening, illustrative of the theoretically safe game. Another type of the conservative game, known as the Ruy Lopez and developing a more lively attack is as follows:

White	Black
1. P—K4	1. P—K4
2. KKt—B3	2. Kt—QB3
3. B—Kt5	

The following simple problem will serve as an introduction to problem solution. Place the men as follows: Black — K. on Q.R1, R. on Q.Kt1, R. on Q.R2, P. on Q.Kt2; White — R. on Q.R1, R. on K.R8, K. on K.Kt6, Q. on K4.

White to play and mate in two moves. The only difficulty for the beginner in this problem is to determine the opening move, which should be Q.—K.R.sq.

Bibliography.— Consult Morgan, Moardecai 'The Chess Digest' (Philadelphia 1902); William, Cook, 'The Chess Players' Compendium' (London 1902); Staunton, 'Chess Praxis' (London 1893); Stanton, 'Chess: Theory and Practice' (London 1883); Steinitz, 'The Modern Chess Instructor' Part I (New York 1889).

FREDERICK C. GRANT.

CHEST, in man and the higher vertebrates, the cavity formed by the breast bone in front and the ribs and backbone at the sides and behind, shut off from the abdomen below by the diaphragm or midriff. It contains the heart, lungs, the great arteries and veins, the trachea or windpipe, the bronchi or branches of the trachea, leading to the lungs, several important nerve-trunks, the thoracic duct, by means of which the lymph and chyle are discharged into the blood, while the œsophagus or gullet passes through it. The diseases of the chest are generally known by the organ affected. The lungs and air-tubes are subject to pleurisy, pneumonia, bronchitis, tuberculosis (consumption) (qq.v.); the heart to pericarditis, endocarditis, enlargement, degeneration, etc., and the arteries to aneurism and degeneration of the walls. See ANATOMY; HEART; LUNGS; NOSE AND THROAT; THORAX; RIB; BREATHING AND HEALTH; INFLUENZA; NERVOUS SYSTEM; RESPIRATION; SKELETON, ETC.

CHEST, NAVAL, the name given in England to certain funds collected for the benefit of seamen of the British navy. In 1590 a sum of from two to six shillings was stopped from the monthly pay of all sailors to support a fund for the relief of disabled or superannuated seamen. The money was kept in a chest, and was known as the "Chest at Chatham." The fund was better organized later and was transferred to Greenwich in 1803, the name chest being still retained. It is managed ex officio, and an annual report is made to Parliament. Disabled sailors, if their injuries are not permanent, receive a sum of money. If permanently disabled, a pension is paid them for one year, for several years or for life.

CHEST DEFORMITIES. These are congenital or secondary to disease either of the bony skeleton of the chest or to a disease within the chest. The congenital deformities usually are a result of failure of development of some one or more of the ribs. They are extremely rare. Funnel chest is a rare but characteristic anomaly. The acquired deformities result mostly from tuberculosis of the spinal vertebræ (Potts Disease), from poliomyelitis, where the defect usually follows muscle unbalance, or

from syringomyelia, a chronic disease of the spinal cord. See POTT'S DISEASE.

CHESTER, Colby Mitchell, American naval officer: b. New London, Conn., 29 Feb. 1844. He was graduated at the United States Naval Academy in 1863; fought under Farragut in the famous battle of Mobile Bay; became captain 12 June 1896; was commandant of cadets at Annapolis 1890–94; commanded the *Galena, Richmond, Newark, Minneapolis* 1895–97; the *Cincinnati* during the war with Spain, and the *Kentucky* 1900–1901. From 1897–98 he was commander-in-chief of the South Atlantic squadron; from 1901–02 was at the Naval War College; in 1903 became rear-admiral; and from 1 Nov. 1902 to 28 Feb. 1906 was superintendent of the United States Naval Observatory. He was engaged upon special duty under the Navy Department until May 1908, when he was assigned by the Secretary of State to represent the United States at the Ninth International Congress of Geographers at Geneva, Switzerland, in July of that year. Also represented the National Rivers and Harbors Association of America at the Sixth International Congress of Navigation at Petrograd, Russia, and the American and Washington Aviation Societies at the Second International Congress of Aeronautics held at London, England, in June 1908. Later he was engaged upon a special mission, under the supervision of the State Department, to investigate commercial affairs in Russia and the Near East, holding, at the same time, commissions from the New York Chamber of Commerce and the New York Board of Trade and Transportation Associations. After retiring from active duty in the navy, 1 July 1909, he occupied himself with writing and lecturing, in Europe and the United States, upon the subjects of international law, geography, aeronautics, commerce, etc.

CHESTER, George Randolph, American author: b. Ohio 1869. He left home at an early age and engaged in various occupations; began newspaper work as a reporter on the Detroit *News;* later on the Cincinnati *Enquirer,* becoming Sunday editor of the latter. He began writing for newspaper syndicates and later for magazines. Many of his stories have been dramatized and produced with great success. His works include 'Get-Rich-Quick-Wallingford' (1908); 'Cash Intrigue' (1909); 'Making of Bobby Burnit' (1909); 'Art of Short Story Writing' (1910); 'Young Wallingford, Early Bird' (1910); 'Wallingford and Blackie Daw' (1913); 'Wallingford in his Prime' (1913); also in collaboration with his wife, Lillian Chester, 'The Ball of Fire' (1914); 'Cordelia Blossom' (1914); 'Runaway June' (1915); 'The Enemy' (1915); 'Pay' (1915).

CHESTER, Joseph Lemuel, American genealogist: b. Norwich, Conn., 30 April 1821; d. London, England, 26 May 1882. His earlier life was taken up chiefly with mercantile pursuits. His literary tastes found expression in contributions to the '*Knickerbocker.*' From 1845 to 1850 he was musical editor of Godey's '*Lady's Book,*' and in 1852 became one of the editors of the Philadelphia *Inquirer* and of the *Daily Sun.* In 1858 he went to England to sell some patent rights, but not succeeding in the undertaking, settled in London, and devoted himself to genealogical investigation. For more than 20 years he collected materials illustrating the ancestry of American families, made special researches for clients, and investigated the English descent of noted Americans, especially that of George Washington. His greatest work was the editing and annotating of 'The Marriage, Baptismal and Burial Registers of the Collegiate Church or Abbey of Saint Peter, Westminster,' dedicated to the queen (1876), a work that cost him 10 years' labor, and which he generously allowed the Harleian Society to issue as one of its publications. He was a founder of this Society in 1869, and edited five of its volumes. He was also a member of the Royal Historical Society, and of many other learned societies in England and America. His non-genealogical writings were 'Greenwood Cemetery, and Other Poems' (1843); 'Treatise on the Law of Repulsion' (1853); 'Educational Laws of Virginia: the Personal Narratives of Mrs. Margaret Douglas' (1854); 'John Rogers, the Compiler of the First Authorized English Bible, the Pioneer of the English Reformation, and its First Martyr' (1861), a work of great industry and research.

CHESTER, England, an ancient and episcopal city, the capital of the county of Cheshire, 16 miles southeast of Liverpool. The two main streets cross each other at right angles and were cut out of the rock by the Romans, 4 to 10 feet below the level of the houses. The houses in these streets were curiously arranged; the front parts of their second stories, as far back as 16 feet, from a continuous paved promenade or covered gallery, open in front, where there are pillars and steps up from the street below, with private houses above, inferior shops and warehouses below, and the chief shops of the town within. These arcades, called the "Rows," together with the walls and the half-timbered construction of many of the houses, with ornamental gables of the 16th century, render Chester perhaps the most picturesque city in England. Saint John's Church, now partially in ruins, is supposed to have been founded by Ethelred in 698. Chester still preserves its old walls, two miles in extent, and the gateways have been rebuilt during the last century. Many modern improvements have been made in the city, but with due regard to the quaint architectural features. Electric lighting has been installed; a modern sewage system, including precipitation works, has been introduced; public baths, markets, a free library, a museum, and a hospital are maintained by the municipality. Chester has manufactures of lead; iron foundries, chemical works and a ship-building yard. It manufactures boots and shoes for export. Its principal trade, however, is in cheese, for which it is a famous market. The improvement of the Dee is bringing back to Chester some of its former importance as a port; there is an increasing importation of ores and timber and an export of manufactured iron. Chester is the terminus of several railway lines. Pop. 39,028.

CHESTER, Ill., city and county-seat of Randolph County, on the Mississippi, 70 miles south of Saint Louis, on the Saint Louis, Iron Mountain and Southern, the Cape Girardeau and Northern, and other railroads. It is the seat of the Southern Illinois Penitentiary and the Illinois Asylum for the Criminal Insane

and contains a public library. The city has manufactories of flour, furniture, hose, shoes, foundry products, wagons and knit goods. Pop. 27,474.

CHESTER, Pa., a city and port of entry of Delaware County, on the Delaware River, and the Philadelphia, Wilmington and Baltimore, the Baltimore and Ohio, and the Philadelphia and Reading railroads, 15 miles south of Philadelphia. The favorable location and excellent shipping facilities of the city have given it a diversity of industries. Chester is the local trade centre of a very prosperous agricultural and manufacturing district. It is the site of the Roach ship yards, where several vessels of the United States navy have been built. According to the Federal census of 1910, Chester has over 128 factories, employing $24,000,000 capital and 8,000 hands, and having annual products to the value of $19,400,000. The principal industries were ship-building, foundry and machine-shop work, and the manufacture of cotton, woolen and worsted goods. The United States census of manufactures for 1914 recorded 153 industrial establishments of factory grade, employing 7,127 persons, of whom 6,295 were wage earners, receiving annually $3,506,000 in wages. The capital invested aggregated $25,148,000, and the year's product was valued at $21,021,000; of this, $7,920,000 was the value added by manufacture. There are national banks having approximately $700,000 capital and a surplus of $575,000, several private banking houses, several daily and weekly newspapers. Chester is connected with Media, Darby and other surrounding towns by electric railways. It is the seat of the Pennsylvania Military College and Crozier Theological Seminary and Swarthmore College is nearby. The notable buildings are the United States government building, including the post-office; the city hall, erected in 1724, of great historic interest; Chester and Homœopathic hospitals and the public library. Besides the educational institutions mentioned, there are public schools, with about 6,000 pupils, and public school property valued at $500,000; a public high school and Chester Academy. Chester was settled by the Swedes in 1643, under the name of Upland, and is the oldest town in the State. It was incorporated in 1866. In 1913 it adopted the commission form of government. Pop. (1914) 40,000.

CHESTER, S. C., capital of Chester County, on the Cheraw and Chester, the Chester and Lenoir and the Seaboard Air Line railroads, 65 miles north-northwest of Columbia. It is a trade centre, cotton is the chief shipping product. It has four banks, a city hall and a court house. The valuation of its property is $5,000,000. Pop. 4,754.

CHESTER STAGE, the youngest of the limestones laid down in the interior sea that covered, in Lower Carboniferous or Mississippian time, much of what is now the Mississippi Valley. Limestones of this stage are found in Texas, Arkansas, Kentucky, Tennessee and Alabama, and in places reach a thickness of 600 feet. Some of the Lower Carboniferous limestones of West Virginia correspond in age to the Chester. The characteristic fossils include several genera of lamellibranchs and brachiopods. See CARBONIFEROUS.

CHESTERFIELD, Philip Dormer Stanhope, 4th EARL OF, English statesman and orator: b. London, 22 Sept. 1694; d. 24 March 1773. On the accession of George I, General Stanhope, his great-uncle, procured him the place of gentleman of the bed-chamber to the Prince of Wales; and the borough of Saint German, in Cornwall, elected him to Parliament, though he had not yet attained the legal age. He soon acquired distinction as a speaker, which he maintained also in the Upper House after his father's death in 1726. In 1728 he was appointed Ambassador to Holland, and succeeded in delivering Hanover from the calamities of the war by which it was threatened. He was afterward, in 1744, appointed lord-lieutenant of Ireland, and on his return in 1746 received the place of Secretary of State; but in 1748 retired from public affairs, and devoted the remainder of his life almost entirely to study and the society of his friends. His talents as an author were displayed in several moral, critical and human essays, in his parliamentary speeches, which were printed at a later period, and particularly in a collection of 'Letters to His Son' (1774), which have become famous. To the charms of wit and grace he united good sense, a thorough knowledge of the manners, customs and the political condition of Europe, and a polished style. He recommends to his son grace of manners as the most essential quality for a man of the world, and even instigates him to licentious irregularities. Another series of letters addressed to his godson, and published in 1889, show Chesterfield in a more favorable light. (See CHESTERFIELD'S LETTERS TO HIS SON). Consult Browning, 'Wit and Wisdom of Lord Chesterfield' (New York 1891); Birrell, 'Lord Chesterfield' (New York 1905); and biographies by Ernst (London 1893); Craig (London 1907). A collection of hitherto unpublished letters appeared in 'Nineteenth Century and After' (ed. by R. Louden, London 1912).

CHESTERFIELD, England, town in Derbyshire, on the Midland Railway, 24 miles north of Derby. It has a large market-place and five principal streets, and is irregularly but substantially built. Among its public buildings are a large parish church, noteworthy for its crooked wooden spire 250 feet high, a commodious townhouse, guild-hall, grammar-school, the Stephenson Memorial Hall and the Chesterfield Institute. The principal manufactures are ginghams, lace, earthenware, leather, etc., but a majority of the working people are employed in connection with the collieries, iron-mines, quarries and blast furnaces of the vicinity. There are also iron-foundries, corn-mills, and engine-works. Mrs. Radcliffe, the celebrated romance-writer, was born at Chesterfield, and a branch of the Stanhope family takes its title of earl from the town. Pop. 37,406.

CHESTERFIELD INLET, Dominion of Canada, an inlet of Hudson Bay, near its northwest extremity 250 miles long and 25 miles across at its widest part. It receives the waters of several rivers, contains numerous small islands and connects with interior lakes.

CHESTERFIELD'S LETTERS TO HIS SON. The letters of Philip, 4th Earl of Chesterfield, a leading statesman of his age, to his (illegitimate) son, Philip Stanhope, are to be

distinguished from the letters to his godson and successor of the same name. Neither set was meant for publication. The 'Letters to His Son' were written between July 1761, when the boy was five and one-half years old, and June 1770. Composed in English, French and Latin, they were designed to convey instruction — both by repeated precept and varied example — in language, history, literature, good manners, morality, and a general knowledge of mankind. At the age of six the boy receives Dryden's «fine lines»:

> When I consider life 'tis all a cheat;
> Yet, fooled with hope, men favor the deceit.

For a knowledge of men, advises Chesterfield, read La Rochefoucauld and La Bruyère. Study the French character-sketches, comparing them with persons you know. Better read one man than 10 books. Human nature, ever the same in essence, is varied in its operations. Discover the ruling passion deep in the heart of the individual; do not trust him where that is concerned. Avoid vulgar liaisons — cultivate polite arrangements. Choose and cultivate the best in all domains of life, but do not necessarily enter the lists as champion of anything. Let people enjoy quietly their errors both in taste and religion. Do not tell everything; acquire the art of dissimulation, and distinguish between this and simulation — never lie. The greatest fools are the greatest liars. Lecky's estimate of Chesterfield is severe: «His delicate but fastidious taste, his low moral principle, his hard, keen, and worldly wisdom.» But the father loved his son, and knew how to be a friend. His letters are full of real, not feigned, interest, and have something for every reader. And he did well to insist upon cultivating «the graces» in an age marked by coarseness of language and conduct in both men and women, when bull-baiting and cock-fighting were deemed genteel. Neither the son nor the godson became a pattern of wit and good breeding; but it is unfair to say that the solicitude of their mentor was lavished on them in vain. A complete edition of Chesterfield's 'Letters to His Godson' did not appear until 1890 (Lord Carnarvon's). Consult also the essay by Sainte-Beuve; and 'Cambridge History of English Literature' (Vol. X).

LANE COOPER.

CHESTERTON, Gilbert Keith, English author and journalist: b. London 1874. He was educated at Saint Paul's School, London. He early began reviewing art books, and his fresh and piquant style soon attracted attention. He has essayed criticism, biography, poetry and fiction, and has specially excelled in the first named, the agreeably pungent flavor of his *obiter dicta* and the heterodoxy of his literary judgments drawing large circles of readers. Among his works are 'Wild Knight'; 'The Defendant'; 'Carlyle' (1903); 'Browning' (1903); 'The Napoleon of Notting Hill' (1904); 'Dickens' (1906); 'Tremendous Trifles' (1909); 'George Bernard Shaw' (1909); 'What's Wrong with the World' (1910); 'Alarms and Discursions' (1911); 'The Victorian Age in Literature' (1913); 'The Flying Inn' (1914); 'A Short History of England' (1917).

CHESTERTOWN, Md., town and county-seat of Kent County, 30 miles east of Baltimore, on the Pennsylvania Railroad and on the Chester River. There are basket factories, phosphate manufactories and planing and strawboard mills. It is the seat of Washington College, organized in 1773. Pop. 2,735.

CHESTNUT, James, American soldier and statesman: b. near Camden, S. C., 1815; d. 1 Feb. 1885. He was graduated at Princeton in 1835. From 1842 to 1852 he served in the South Carolina legislature and from 1854 to 1858 was a member of the State senate. A vacancy occurring in the United States Senate, he was appointed to fill the unexpired term, and was formally elected senator in January 1859. He resigned on 10 Nov. 1860, in anticipation of the secession of South Carolina, but his resignation was not accepted, and he was formally expelled, 11 July 1861. In the meantime he had been appointed delegate to the Confederate Provisional Congress. He was commissioned colonel in the Confederate army and detailed as aide-de-camp on the staff of Jefferson Davis. In 1864 he was promoted brigadier-general and assigned to a command on the coast of South Carolina. In 1868 he was a member of the National Democratic Convention that nominated Horatio Seymour for the presidency.

CHESTNUT, chĕs'nŭt, a genus of trees, and shrubs (*Castanea*) of the family *Fagaceæ*. The species are characterized by long male catkins and bristly ovaries (burs) which contain rounded nuts. Three species are of wide economic use, their wood being used for many purposes, their bark for tanning and their nuts for food. In America the most important species is the common chestnut (*C. dentata*), which is a tall spreading tree often attaining a height of 100 feet and a girth of 10 or more feet in the forests, which are usually upon high gravelly or sandy land or mountain sides where clay and limestone are absent or in but slight evidence. Its range is from New England to the high lands of Alabama and westward to southern Michigan. During the closing half of the 19th century this species attracted the attention of horticulturists, who have produced about a score of improved varieties worthy of being cultivated for their nuts. The Japanese chestnut (*C. crenata*) has long been cultivated for its large nuts, which are produced by very young trees and are highly prized for food. The trees are rather dwarf, compact and symmetrical, and free from the attacks of blights, qualities which, together with their ease of propagation, have commended them to orchardists throughout the world. During the closing years of the 19th century it came into prominence in America. The European chestnut (*C. sativa*), a native of southern Europe, northern Africa and western Asia, is a large tree which forms great forests throughout its range. Its nuts are probably more widely used as food than those of either of the other species, being a principal article of diet in the western countries bordering the Mediterranean Sea. In America it has become popular with orchardists on account of its large nuts. Of the three species the American produces the finest flavored nuts, but they are generally much smaller than those of the other two species.

Another American species is valued for its

nuts. The chinquapin (*C. pumila*), which is usually less than 10 feet tall, but occasionally attains a height of 30 feet or even more, is found from Pennsylvania to Florida and westward to Indiana and Texas. It bears small ovoid pointed nuts about half the size of ordinary American chestnuts. They are as yet little cultivated and have produced few varieties.

The various species and their varieties are readily propagated from seed. The seedlings are, however, generally grafted with choice varieties, and when the grafted plants are one or two years old they are set in orchards and cultivated like other fruits or are allowed to care for themselves. In places where chestnuts grow naturally, the sprouts which arise from the stumps of felled trees are often grafted with European or Japanese varieties, and the land pastured with sheep. The principal enemy of the chestnut in North America is the chestnut bark disease, produced by a parasitic fungus. This has caused the death of large forests of the trees in the northern portion of their range and threatens the destruction of all the native chestnut trees. So far, no wholly satisfactory method of fighting it has been discovered.

CHESUNCOOK, chē-sŭn'kŭk, **LAKE** is in Piscataquis County, Maine. It is really an expansion of the Penobscot River, is 20 miles long and 2,500 feet above sea-level.

CHETTIK, chĕt'ĭk, a tree of Java, the *Strychnos tieute*, yielding a very virulent poison called by the same name, more powerful than that obtained from the upas-tree. It causes violent convulsions. There is no known antidote.

CHETTLE, Henry, English dramatist and pamphleteer: d. about 1607. He was editor of Greene's 'Groatsworth of Wit' (1592), wrote 13 plays of considerable merit, and was part author of 35 others, including 'Robin Hood' in two parts; 'Patient Grisel'; 'The Blind Beggar of Bethnal Green'; and 'Jane Shore.' In Meres' 'Palladis Tamia' (1598) he is mentioned as one of the "best for comedy amongst us." Of his other works, his 'Kind-Hart's Dreame' (1593?) and 'Englande's Mourning Garment' (1603), are of interest, the former as containing an apology undoubtedly intended for Shakespeare as one of those whom Greene had attacked; the latter having a stanza supposed to be addressed to Shakespeare as "silver-tongued Melicert."

CHEVAL, shē-văl, À (Fr. *Cheval,* horse), on horseback, astride any object. In a military sense, a body of troops is said to be *à cheval* of a river, if one wing is stationed on the right and the other on the left bank.

CHEVALIER (Lat. *caballus,* horse, Fr. *Chevalier*), an honorary title given especially in the 18th century, to younger sons of French noble families. Brought up in comparative luxury, and left at the death of their fathers almost entirely unprovided for, these men generally lived at the expense of others, as a sort of aristocratic parasite, even when they did not prefer recourse to such less honorable means of livelihood as gave occasion to the synonym for swindler, *chevalier d'industrie.* In the plays of the 18th century the chevalier is a constant figure. Both the Old and Young Pretender were each called the Chevalier by their partisans. The word is at present often used with its old meaning, and a chevalier may mean a man of honor. The chevalier was originally so called because he rode a horse; but as only the nobles and those connected with the life of the upper classes could afford horses, the term chevalier came to have the sense we attach to it to-day.

CHEVALIER, shę-vă'-lyā, **Albert,** English comedian: b. 21 March 1861. He is of Italian, French and Welsh blood. His first appearance was at the age of eight. For many years he was associated on the stage with the Kendals, John Hare, etc. For four years he appeared in music halls, then he came into vogue as a drawing-room entertainer with his coster ballads. He has made tours in England and America and has given 1,000 recitals at Queen's Hall, London. Besides 100 sketches, monologues and plays, he has written a volume of reminiscences, 'Before I Forget' (1901).

CHEVALIER, Michel, French economist: b. Limoges, 13 Jan. 1806; d. Montpellier, 28 Nov. 1879. He was educated as an engineer in the School of Mines, joined the Saint Simonians and suffered six months' imprisonment for promulgating the free doctrines of Père Enfantin's party. On his liberation he renounced his extreme doctrines, and was sent to the United States and to England on special missions. He spent two years in America, traveling, investigating and making his report to the French government and writing frequent letters to the *Journal des Débats.* He visited the United States, Mexico and Cuba. He negotiated with Richard Cobden a commercial treaty between England and France in 1860. He became a councillor of state (1838), professor of political economy in the Collège de France (1840), member of the Chamber of Deputies (1845), and member of the Institute (1851), senator in 1860, and grand officer of the Legion of Honor the following year. He published 'Letters on North America' (1836); 'On the Materials of Interest in France'; 'Essays on Industrial Politics'; 'Course in Political Economy'; 'History and Description of the Ways of Communication in the United States' (1840–42); 'Mexico: Ancient and Modern' (1863). He was a strong advocate of free trade, and a specialist on questions of currency.

CHEVAUX-DE-FRISE, shė-vō-dė-frēz (Friesland horses, so called because first used at the siege of Groningen, in that province, in 1658), armed beams of square timber or iron used to defend the fronts of camps, breaches, etc., by closing them up. They are usually from 15 to 18 feet long, and connected by chains, each being perforated with small holes to receive rods of wood or iron, pointed at their extremities, and when moved in any direction making a sort of hedge of spears. In their original form they were made of spears, sword-blades and other steel instruments such as were readily found at hand in the army equipment.

CHEVERUS, shĕ-vrŭs, **Jean Louis Anne Magdeleine Lefebvre de,** French bishop and cardinal of the Roman Catholic Church: b.

Photograph by J. Horace McFarland Co.

CHINQUAPIN

Mayenne, France, 28 Jan. 1768; d. Bordeaux, 19 July 1836. He was ordained priest in 1790. Refusing to take the constitutional oath regarding the clergy, he was imprisoned at Paris as contumacious in 1792, but escaped to England. There he engaged in missionary work, but in 1796 he came to Boston, Mass., where he was noted for his graceful and winning pulpit eloquence. In an epidemic of yellow fever in the city he ministered bodily and spiritually to the stricken. He studied the language of the Abenaki Indians on the Penobscot and the Passamaquoddy in Maine, visited their settlements and remained among them at his first visit three months; and every year thereafter he repeated his visit to them, built them a church and procured for them a missionary priest, who thereafter till his death, 20 years later, devoted himself to their spiritual care. On the occasion of a visit of President John Adams to Boston, the two seats of honor at a public banquet were reserved for the chief magistrate and the priest. Mr. Adams' name headed the list of names of subscribers to a fund to erect a church for Cheverus' congregation. In 1810 Cheverus was consecrated bishop of Boston and entered on the duties of the episcopate with a zeal and industry that taxed his strength to the utmost, and his physicians in 1823 counseled his return to his native land. There the French king, Charles X, named him bishop of Montauban, and, in 1826, bishop of Bordeaux and a peer of France. Here in a visitation of cholera he placarded his episcopal palace as a *maison de sécours* or dispensary. At the instance of King Louis Philippe the Pope, Pius VII, in 1836 created him a cardinal. The position that Boston now holds in the Catholic Church is due to the earnestness, zeal and skilful administration of Cheverus during his years of labor there. Consult 'Life,' by Huen-Dubourg (1837).

CHEVES, chēvz, **Langdon,** American statesman: b. Rocky River, S. C., 17 Sept. 1776; d. Columbia, S. C., 25 June 1857. He began to study law at the age of 18, entered upon his profession with superior natural qualifications and after severe discipline he rapidly attained eminence and wealth in its practice. He was a representative in the national Congress before and during the War of 1812, and was a zealous supporter of the party which carried the declaration of war. He was chairman of the Naval Committee in 1812, and of the Committee on Ways and Means in 1813, and constantly opposed the restrictive system. When Henry Clay was sent as commissioner to Ghent, Cheves succeeded him as speaker of the House. He retained this office till 1815. The National Bank under injudicious management had become hard pressed and was on the verge of stoppage in 1819, when Cheves was elected president of its board of directors. By a rigorous system of retrenchment, and by making credits only upon sufficient securities, the bank was saved, and specie payments maintained at the principal centres of commerce. Resigning office after three years, he became chief commissioner under the treaty of Ghent for settling some of its provisions.

CHEVET, chĕ-vā, a variety of the apse, almost exclusively confined to French Gothic churches. The extreme end of the chancel or choir is called the chevet. The apses or chapels are made to radiate around the choir aisle. There are generally five apses, but, especially in early architecture (from the 11th century), constructions with four apses are met with. Henry III introduced the chevet into England, in a part of the edifice of Westminster Abbey. In some French churches there are only three; but in others there are seven, and in still others, nine apses, the second one of which was generally dedicated to the Virgin Mary.

CHEVILLARD, shĕ'-vē'yär', **Camille,** French composer: b. Paris, 14 Oct. 1859. His father was the famous 'cellist, Pierre Chevillard. He was self-taught in composition and studied the piano under G. Mathias. For many years he was assistant conductor to his father-in-law, Lamoureux, whom he succeeded in 1899. He continued the *Concerts Lamoureux* and maintained the high standard established by his predecessor. He received the Chartier prize for chamber music in 1903, and in 1913 became president of the French Society for Chamber Music. His compositions include a symphonic ballad, a symphonic fantasy, a string quartet, a piano trio, a sonata for violin and piano, and a sonata for piano and 'cello.

CHEVIOT, shĕ'-vĭ-ŭt, **HILLS,** a range on the borders of England and Scotland, stretching southwest to northeast for above 35 miles, the larger part of the range being in Northumberland, England, and the lesser part in Roxburghshire, Scotland. Their culminating point, known specially as the Cheviot, has a height of 2,676 feet; Carter Fell, the next in height, is a little more than 2,000 feet high. They are clothed for the most part with a close green sward, and are pastured by a celebrated breed of sheep admirably adapted for hilly districts, and known in many of the more elevated districts of Great Britain. They form the head-waters of the Tyne, Tweed and other rivers of the border country.

CHEVIOT SHEEP, a breed of sheep of large carcass and valuable fleece, which has been pastured from time immemorial on the Cheviot Hills, on the borders of England and Scotland, and which from its powers of endurance is justly regarded as the most valuable mountain sheep of Great Britain. The peculiar features of the Cheviots are the absence of horns in both sexes; white or mottled-gray face and legs, an erect, long and clean head, destitute of wool, while both the throat and neck are well covered, long open ears well covered with hair, and altogether a fine, open, sprightly countenance, with every indication of hardiness. The fleece weighs from three to four pounds, and the weight of the carcass varies in ewes from 12 to 16, and in wethers from 16 to 20 pounds per quarter. The Cheviots, though originally confined to a small area, are now spread over all parts of the kingdom, and, except on the most barren and stony grazings, are far more profitable than the heath breed.

CHEVREUL, shė-vrėl, **Michel-Eugène,** French chemist: b. Angers, 31 Aug. 1786; d. Paris, 9 April 1889. He was educated in his native town, and when a youth went to Paris, and was employed in the chemical factory of Vauquelin. In 1813 he became professor of

physical science in the Charlemagne Lyceum; in 1824 he was made director of dyeing in the carpet manufactory of the Gobelins, and in 1830 succeeded Vauquelin in the chair of chemistry at the Museum of Natural History. He was the author of 'Lectures on Chemistry Applied to the Art of Dyeing' (1831) and other treatises on chemistry and dyeing, and an important work on the 'Principles of Harmony and Contrast of Colors' (1839), which has been translated into English. He was a commander of the Legion of Honor, and the centenary of his birth was celebrated in Paris with much enthusiasm. Chevreul's studies and discoveries had a deep and far-reaching effect upon the scientific development of organic chemistry. He led the way to the use of proper methods of analyses and the establishment of scientific rules of procedure with the use of fixed nomenclature in all chemical investigation, which, he insisted, should be, above all things, exact. He is one of the most original figures of his age and he has left a very definite impression on the page of chemistry.

CHEVREUSE, chĕv-rèx, **Marie de Rohan Montbazon,** mŏn-bă-zŏn, DUCHESS OF, daughter of the Duke of Montbazon, French political adventuress: b. December 1600; d. Gagny, near Paris, 12 Aug. 1679. When scarcely 17 years old, she married the Duke of Luynes who died four months afterward. She next became the wife of Claude de Lorraine, Duke of Chevreuse. A great friend of Anne of Austria, by whom she was made superintendent of the royal household, she incurred the hatred of Richelieu, and succeeded so well in making herself obnoxious to him, that he determined to have her arrested; but, made aware of his project, she assumed man's attire, crossed the Somme by swimming and fled to England (1637). For years she was an exile from France, and King Louis XIII had been inspired by his minister with such fear of her uncontrollable spirit and cunning, that in his will he forbade her return to France. In spite of this, Anne allowed her to return, without, however, showing her the same degree of confidence as before; though she made her a present of £250,000. Afterward she engaged in new plots against Mazarin, mostly acting in concert with Cardinal de Retz, and was once more compelled to leave France, fleeing to Flanders. She soon returned to France and made her peace with Mazarin, and became his helper in several political intrigues. Throughout all these adventures and audacious intrigues the Queen had a soft place in her heart for the pretty, clever and charming Duchess, whom she learned, however, not to trust altogether.

CHEVRON (Fr. *chèvre,* a goat), chĕv'rŭn, a bent bar or shield, rafter-shaped, in heraldry. A chevron is, according to some, a third, and, according to others, a fifth of the field. A chevronel is half a chevron, and the couple close the fourth of the shield. A chevron couped is that which does not reach the sides of the escutcheon. A chevron in chief is one which rises to the top of the shield. In architecture a chevron is a zigzag molding, characteristic of romanesque architecture in France, England and Sicily. It is a common decoration of the Norman arch. It is also used as a badge of rank by officers of armies, navies, police and other uniformed bodies.

CHEVROTAIN, shĕv'rō-tān (Fr. *Chevrot,* Lat. *caper,* goat) a family (*Tragulidæ*) of ungulates, which though ruminant, in the general sense, differ in many respects from true deer; they resemble the true *Cervidæ* in certain minor peculiarities, and the musk-deer in others; but anatomically they are, in the main, distinct, especially in such of the more important characteristics as make naturalists class them by themselves. The chevrotains are divided into two genera, one African, and the other Asiatic, the latter genus (*Tragulus*) being that of the true chevrotains. These form a group of diminutive, hornless, deerlike animals, standing only about 12 inches high, found in southern India, Ceylon and the Malayan Peninsula. They are usually reddish, tawny or mouse-gray in color, except the Indian mouse-deer (*Tragulus meminna*), which is flecked with white. The "water-deer" of western Africa is a kindred species, as is also the species found in the Philippines. These animals are shy little creatures, with a peculiarly stiff manner of walking, and given to hiding in thickets and inaccessible crags. They may, however, be readily tamed. They are considered as a survival of the Miocene form to which is also attributed the ancestry of the deer.

CHEVY CHASE, chĕv'ī chās, the name of a celebrated border ballad probably founded on some actual encounter occurring between Percy and Douglas, although the incidents mentioned in it are not historical. It is this ballad that Sir Philip Sydney speaks of when he says, in his 'Defense of Poetry,' "I never heard the old song of Percie and Douglas that I found not my heart moved more than with a trumpet"; and which is made the subject of a critique by Addison in Nos. 70 and 74 of the *Spectator.* On account of the similarity of the incidents in this ballad to those of 'The Battle of Otterbourne,' the two ballads have often been confounded; but the probability is that if any historical event is celebrated at all in the ballad of Chevy Chase, it is different from that celebrated in 'The Battle of Otterbourne,' and that the similarity is to be explained by supposing that the incidents were borrowed.

There are two versions of the ballad bearing the name of Chevy Chase, an older one and a more modern one. The older version is sometimes called the 'Hunting of the Cheviot,' which is its original title. It begins thus:

> "The Persè owt of Northombarlande,
> And a vowe to God mayd he,
> That he wolde hunte in the mountayns
> Off Chyviat within dayes thre,
> In the mauger of doughte Dogles,
> And all that ever with him be."

Neither the exact age nor the name of the author of this version is known. From the fact that it is mentioned in the 'Complaynt of Scotland,' written in 1548, where it is called the 'Huntis of the Chevot,' it is clear that it was known in Scotland before that time, and since James of Scotland is mentioned in the ballad, it may be inferred that it was not written before the reign of Henry VI, for James I did not ascend the throne of Scotland till two years after Henry VI had become king of England. As for the author, it is true that a manuscript of the ballad contained in the Ashmolean collection at Oxford is subscribed by one Rychard

Sheale, but it is likely that this Rychard Sheale was merely one who had frequently recited the ballad, and perhaps the person who committed this old version to paper. This is probably the version with which Sir Philip Sydney was acquainted, since he speaks of it as "evil apparelled in the dust and cobweb of an uncivil age."

The age of the more modern version is no better known than that of the older one, but it is said by Dr. Rimbault to be no later than the reign of Charles II. This is the version which forms the subject of the critique by Addison in the above-mentioned numbers of the *Spectator*. The following is the opening stanza as given in Percy's 'Reliques':

> " God prosper long our noble king,
> Our lives and safetyes all;
> A woefull hunting once there did
> In Chevy-Chace befall."

CHEW, Benjamin, American jurist: b. West River, Md., 1722; d. 1810. He studied law in Philadelphia in the office of Andrew Hamilton and later in London. He returned to Philadelphia in 1754 and held successively the offices of register of wills, attorney-general and chief justice of Pennsylvania. He joined the ranks of the Loyalists on the outbreak of the Revolutionary War, resigned the office of chief justice and retired to private life. His stubbornness in refusing to sign a parole led to his imprisonment at Fredericksburg, Va., in 1777. During the battle of Germantown his mansion there was badly damaged in the bombardment. From 1790 to 1806 Chew was president of the High Court of Errors and Appeals, which was abolished in the latter year.

CHEW, Ng Poon, Chinese-American editor: b. Sun Ning, China, 1866. He was educated at the Occident School, San Francisco, and at the Theological Seminary there. He was destined for the Taoist ministry by his parent, but becoming a convert to Christianity he entered the Christian ministry. In 1899 he resigned and established the first illustrated Chinese weekly and also the *Chung Sai Yat Po*, the first Chinese daily newspaper in the United States. In 1906 he was made adviser to the Chinese consulate general. He is a recognized authority on matters pertaining to Asiatic exclusion and Chinese-American relations. His published works include 'Non-Exclusion' (1905) and 'Treatment of Exempt Classes of Chinese in America' (1908).

CHEWING-GUM, a resinous gum used as a masticatory. The habit of chewing gum is perhaps peculiar to the United States. At first the resinous exudations of the spruce, cherry, etc., were employed in their native state; but with the increase of the habit the spruce supply nearly failed, and recourse was had to other ingredients. The gum resins of sweet gum, tamarack and certain other forest trees are also used. Balsam of tolu is a constituent of certain kinds of gum, while paraffin has also been employed. Paraffin is also very largely used as an adulterant in the cheaper grades of gum, which in consequence crumble when chewed. Of late years a gum known as chicle, an elastic gum from the naseberry, a tree of tropical South America, somewhat similar to the India-rubber tree (q.v.), has come to the front as the foundation of most of the chewing-gum. The chicle gum is chopped into fine particles, dried and then cooked in steam-jacketed kettles. At this stage sweetening and flavoring ingredients are added to the mass, which is mixed mechanically. The resulting "dough" is then kneaded on a table and rolled between rollers having knives set into their faces. These knives cut the sheets into suitable sizes for the market, and, after drying, the sticks are wrapped, packed and shipped. The practice of chewing gum is probably harmless, and in mild cases of indigestion it may even be somewhat beneficial, by mechanically stimulating the flow of saliva. Pepsin, mint and similar substances are often mixed in with the gum; thymol being added in the so-called antiseptic gums, but it is safe to say that the success of any particular brand depends more upon its sweetness and flavor than upon any beneficial properties. In 1914, 2,689 persons were engaged in the manufacture of chewing-gum in the United States, in 74 establishments with a capital of $10,625,000; the salaries and wages amounted to $1,648,000. Raw materials to the value of $7,322,000 were turned into a finished product valued at $17,159,000.

CHEWINK. See TOWHEE BUNTING.

CHEYENNE, shī-en' (Sioux, "red," i.e. foreigners = enemies: their own name = "ours") an important Indian tribe of the great Algonquin stock, and its westernmost member except the Blackfeet. In the 18th century they lived on the Cheyenne River in eastern North Dakota, but were gradually driven southwest by the Sioux to the forks of the Big Cheyenne near the Black Hills, where Lewis and Clark found them in 1803. Originally settled agriculturists, their acquisition of horses turned them, like the other plains Indians, into nomad raiders and led to their foraying even to Mexico, and claiming lands as far apart as the upper Missouri in northern Montana, and the forks of the Platte, though they numbered but little over 3,000. The first United States treaty with them was made in 1825 in the former locality. They had already fraternized with the Sioux; and when their location at the Black Hills grew unsatisfactory, one section (the "Northern Cheyenne") joined the Ogallalla Sioux in driving the Crows from the Powder and Tongue river valleys in southeast Montana, while the remainder (the "Southern Cheyenne") moved south and formed a confederacy with their Algonquin kinsmen, the Arapaho, on the Arkansas. In 1851 a treaty was made with the Northern band at Fort Laramie, on the North Platte, to cut roads through their lands. A number of treaties were made with the Southern, but it is alleged that the commissioners neither made them intelligible nor executed them fairly; the Cheyenne, with their Indian allies, committed the usual atrocities which were their one method of retaliation; the settlers clamored for their extermination; the military desired to cow them by heavy punishment; the Indian Department blamed both and wished peace. The Indian commissioner in 1864 sent some 400 Cheyenne and Arapaho to a camp at Sand Creek, Colo.; Colonel Chivington fell upon them 29 November (see SAND CREEK MASSACRE), and butchered 131 men, women and children. A bloody and costly war followed; the next year the tribe consented to go upon a reservation, except a band called the "Dog Soldiers,"

who held out. In 1867 Hancock burned their village at Pawnee Fork, and another war with them began. On 27 Nov. 1871, Custer inflicted a crushing defeat upon them at the Washita in Indian Territory, killing Black Kettle, their chief, and compelling them to return to their reservation. The Northern band all this time remained peaceful, despite urgent solicitations from their brethren and the Sioux. Fresh treaties were made in 1866 and 1868. The Northern Cheyenne are on a reservation in the Tongue River Valley, Custer County, Mont.; the Southern Cheyenne are united with the Arapaho, in Oklahoma; their reservation was on the Canadian River, near Elreno, but was opened up in 1892. The tribe numbers about 3,055, and is governed by a council of five chiefs. The Cheyenne are a tall, finely built race, the best physically of all the plains Indians except the Osages; but rather dull intellectually. Their language is one of the most difficult even of Indian tongues. They live in tepee, observe the Sun Dance, and maintain a complex social organization. Consult Dorsey, 'Field Columbian Museum Publications' (Chicago 1905).

CHEYENNE, locally shī'-ăn', Wyoming, city, capital of the State, and county-seat of Laramie County, on the Union Pacific, the Colorado and Southern, and the Burlington Route railroads, 110 miles north of Denver. Cheyenne, named after the local Indian tribe, is situated in the southeastern part of the State on a plateau near the Laramie Range, 6,075 feet above sea-level. A boulevard three miles in length extends northwest to Fort D. A. Russell, an important United States military post, with buildings and equipment valued at $7,000,000, commemorating the Union officer, Maj.-Gen. David Allen Russell, who was killed at Opequan, Va., in 1864. Cheyenne was founded and the fort built in 1867, by Union Pacific Railroad engineers and United States army officers, when the railroad reached this point, and here the Union Pacific Railroad established its main work and repair shops which have contributed largely to the industrial prosperity of the city. Coal, iron, oil and other valuable mineral deposits are worked in the vicinity, and besides numerous manufactures of commodities for local consumption and export, dry-farming, cattle and sheep-grazing are large and important industries. Cheyenne is the centre of an extensive meat-growing region, shipping beef-cattle and sheep to eastern markets, and is also the supply depot for a large amount of the game hunting trade and sport of the Rocky Mountains. Cheyenne is attractively laid out with broad streets and boulevards, and enjoys the distinction of having been the first city in the United States to be lighted by electricity. It has modern gas plant, electric street car system, an up-to-date fire department, and a municipal system of waterworks, including five storage reservoirs and a filtration plant which cost $80,000; its parks and ornamental lakes cover 800 acres. "Frontier Days," an annual celebration providing the largest Wild West show of its kind in the world, is a feature of civic life which attracts thousands of visitors. Cheyenne was selected capital of Wyoming Territory in 1869, and was almost destroyed by fire in the same year. The city is administered by three commissioners under the commission form of government. Its chief buildings are the State capitol, the Federal building and post-office, the State governor's mansion, city hall and county courthouse, soldiers and sailors' home, Carnegie library, banks and trust buildings, schools and high school, the Industrial and other clubs, Masonic, Elks, Eagles buildings, hospital, opera-house, Union Pacific station, good hotels and handsome churches of the leading religious denominations, including the Convent of the Holy Child Jesus and Saint Mary's Catholic Cathedral. Pop. 16,000.

CHEYNE, chān, **George,** Scottish physician: b. Methlick, Aberdeenshire, 1671; d. Bath, England, 13 April 1743. He started a London practice in 1702, in which year he was elected a fellow of the Royal Society. Full living made him enormously fat, as well as asthmatic, but from a strict adherence to a milk and vegetable diet he derived so much benefit that he recommended it in all the later of his dozen medical treatises, which included 'A New Theory of Fevers' (1701); 'Philosophical Principles of Natural Religion' (1705); 'Essay of Health and Long Life' (1725); and the 'English Malady, a Treatise on Nervous Disorders' (1733).

CHEYNE, Thomas Kelly, English biblical scholar: b. London, 18 Sept. 1841; d. 16 Feb. 1915. He was educated at Merchant Taylors' School, Worcester College, Oxford and Göttingen. In 1868 he was elected fellow of Balliol College and from 1885 to 1908 he was Oriel professor of the interpretation of Scripture at Oxford. He edited the Old Testament portion of the Variorum Bible for Messrs. Eyre and Spottiswoode, and in 1884 became a member of the Old Testament Revision Company. His numerous works deal exclusively with the exposition and criticism of the Old Testament books, and reveal a scholarly and able attempt to reconcile the views of the advanced critics of the Bible with those of the evangelical school.

CHEYNE, Sir **William Watson,** English surgeon. He was b. Edinburgh, 14 Dec. 1852, educated at Edinburgh University, and was Hunterian professor of the Royal College of Surgeons of England, 1888–90. He has published 'Antiseptic Surgery' (1882); 'Manual of the Antiseptic Treatment of Wounds' (1885); and other important professional works. He was created a baronet in 1908.

CHEYNE-STOKES RESPIRATION, a breathing common in severe cases of diseases of the heart, kidneys or other severe affections. The respirations occur in a cycle; becoming gradually deeper and more frequent up to a point when they grow weaker until to all appearances breathing ceases. After a pause the cycle begins all over again. Such a state usually presages death.

CHEYNEY, chā'-nē, **Edward Potts,** American educator and sociological writer: b. Wallingford, Pa., 17 Jan. 1861. After graduating from the University of Pennsylvania in 1883, he took a post-graduate course there, and later traveled abroad, studying in German universities and in the British Museum. Upon

his return he was appointed professor of European history in the University of Pennsylvania. He has written 'Social Changes in England in the 16th Century' (1896); 'Social and Industrial History of England' (1901); 'A Short History of England' (1904); 'Background of American History' (1905); 'Readings in English History' (1908); 'A History of England, from the Defeat of the Armada to the Death of Elizabeth' (2 vols., Vol. I, 1914); also monographs and review articles on history and economic subjects.

CHÉZY, shā-zē, **Antoine Léonard de,** French Orientalist: b. Neuilly, France, 15 Jan. 1773; d. there, 31 Aug. 1832. He began his studies in the École Polytechnique, and afterward attended the lectures of Audran, Caussin and Silvestre de Sacy, on Oriental literature. Unassisted, he taught himself Sanskrit, and became so proficient in it that, in 1815, a chair of Sanskrit was formed expressly for him in the College of France. Among his productions is a free French translation of the Persian poem, 'Medjouin and Leila.' He also published Kalidasa's drama of 'Sakuntala,' in the original, with a translation accompanied with notes. Consult Klenck, 'Chézy, Wilhelmine Christine von' (Paris 1830).

CHÉZY, Wilhelm von, German novelist and historical essayist: b. Paris, 21 March 1800; d. Vienna, 13 March 1865. He was the son of A. L. Chézy (q.v.). He acquitted himself creditably as a journalist, and wrote many popular tales: 'The Wandering Pupil' (1835); 'The Six Noble Passions' (1842); and 'The Last Janissary' (1853), among them; as well as 'Chivalry in Picture and Word' (1848).

CHHATISGARH, chŭt-tēs-gär', India, the southeast division of the Central Provinces, comprising formerly the districts of Raipur, Bilaspur and Sambalpur, and several small feudatory states. In 1906 Sambalpur was given to Bengal, and the district of Drug constituted out of parts of Raipur and Bilaspur. Its area is 21,240 square miles. It is mainly a vast fertile plateau, and has of late become a great centre of the Indian grain trade. Dongargáon is the capital. Pop. 3,246,767.

CHIABRERA, Gabriello, kē-äb-rā'rā, Italian lyric poet: b. Savona, 8 June 1552; d. Savona, 14 Oct. 1637. Impatient of dependence on the great, he again and again abandoned the courts of noble patrons. He visited Rome and resided a considerable time at Florence and Genoa, settling finally in his native place. Wherever he went he was loaded with presents and honors. Pindar and Anacreon were his models among the poets, and his countrymen named him "the Italian Pindar," but his Pindaric odes have little grace and force, being labored rather than spontaneous. Some of his little songs after Anacreon are models of elegance and grace. He wrote epic and dramatic poems also. He showed himself a master of complex rhythms ambitious and new in form, and a master of the Italian language such as had never before appeared. He was the last of the great Italian writers until the appearance of Manzoni in modern times. He left a charming autobiographical sketch. His collected poems were published under the title of 'Rime.' Chiabrera showed little originality in anything except a few of his lyrics; but his strict adherence to Latin form had a strong influence upon succeeding Italian literature.

CHIAJA, kyā'-ya, a fashionable driveway in modern Naples, commencing at the Largo Vittoria and extending for a mile along the coast. On one side is the public park, the Villa Nazionale and on the other side are many handsome and imposing buildings and hotels.

CHIAN, kī'ăn, or **CYPRUS TURPENTINE,** a greenish-yellow, non-acrid turpentine or resin obtained mainly from the island of Chios (Scio), yielded by *Pistachia terebinthus,* of the order *Anacardiaceæ,* a large tree, native to the Mediterranean islands and shores. The turpentine, now used only in medicine, exudes from the tree in small quantities during the warmer months, but it is obtained at other seasons by making incisions in the bark.

CHIANA, kē-ä'nä (the ancient *Clanis*), a river of central Italy, originally a tributary of the Tiber, watering a perfectly level valley, which its overflow rendered once the most pestilential district of Italy. The bed was deepened in 1789–1816, and in 1823 extensive hydraulic works were undertaken for further improving the river course, and for leading a north branch, through canals, to the river Arno, a few miles below Arezzo, the south stream reaching the Tiber through the Paglia at Orvieto. The double stream is 60 miles long, and one-half to one mile broad; and the district has since become one of the most fruitful in all Italy.

CHIANTI, kē-ăn'tī, a district in Tuscany, province of Siena, Italy, where what is now the best-known red wine of Italy is produced. Chianti wine is full flavored and astringent, with an alcoholic strength of about 20 per cent.

CHIAPANECS, chē-ä'pä'nĕks, or **CHAPANECS,** a tribe of Indians inhabiting the state of Chiapas in the southern part of Mexico. They were at one time very powerful and evidently were well advanced in agriculture and picture writing. They also had made some progress in mechanical art and lived in well-made houses. They were never conquered by the Aztecs but the Spaniards easily overcame them. A few remaining members of the tribe still exist in central Chiapas. They are supposed to have entered Mexico at a time much anterior to the arrival of the Aztecs, from whom they borrowed a part of their religious ideas and some of their culture. They also borrowed from the Mayas of Yucatan and northern Guatemala. So long as they have been known to history and tradition, the Chiapanecs have been a cultured race. See MEXICO — ETHNOLOGY.

CHIAPAS, chē-ä'pas, Mexico, a state of this republic on the Pacific slope, bordering on Guatemala, having an area of 27,111 square miles. The capital is Tuxtla-Gutiérrez. The state is in many parts mountainous, and is also in many parts traversed by fine streams, including the Rio Chiapas. At Palenque are the ruins of an ancient Aztec city of great beauty and magnitude. The valleys have a rich soil and produce maize, sugar, cotton, etc. Some of the largest rubber plantations in the world are now being laid out here. There is a considerable export of logwood. Trade is, however, in a

backward state for lack of roads. Education is free and compulsory, but the law is not strictly enforced. The state forms part of the Central American table-land, and has a fine climate although the whole region is largely clothed in primæval forests. Pop. 438,843.

CHIARI, kē-ä'rē, **Pietro,** Italian novelist and comedian: b. Brescia 1700; d. Brescia 1788. After completing his studies he entered the order of Jesuits, but soon changed the monastic for the secular life and devoted himself solely to letters. He resided at Venice, with the title of poet to the Duke of Modena, and in the space of 10 or 12 years brought more than 60 comedies on the stage. Chiari and Goldoni were rivals, but the public adjudged the palm to the latter. Chiari's dramas in verse fill 10 volumes; those in prose, four.

CHIARI (known to the Romans as CLARIUM), Italy, town in Lombardy, in the province of Brescia, 14 miles west of Brescia and 36 miles east of Milan. It is well built, has several churches, two convents, an elementary school, a hospital and a public library. It was formerly fortified, and some of its ancient defenses still exist. It has manufactories of silk, linen and cotton, and some tanneries. Prince Eugene here defeated the French and Spanish troops, 1 Sept. 1701. Pop. 12,489.

CHIARINI, kē-ä-rē'nē, **Giuseppe,** Italian poet and critic: b. Arezzo, 17 Aug. 1833; d. 1908. He began life as an official in the department of education, was in 1866 president of the Liceo of Livorno; in 1882 of the Liceo Umberto I, Rome, and in 1892 general superintendent of secondary education. He was a student of foreign literatures, especially English and German, and was editor of literary journals. His verse is mostly lyrical and has been collected under the titles 'Poems' (1874); 'In Memoriam' (1875); 'Lacrymæ' (1879), etc. It gives proof of deep poetic sensibility. He translated some of Heine's poems and published critical essays on English and German poets.

CHIAROSCURO, kē-är-ŏs-kū'rō, or **CHIAROOSCURO,** kē-ä-rō- (It. *chiaro,* clear; *oscuro,* dark), in painting the art of judiciously distributing the lights and shadows in a picture. A composition, however perfect in other respects, becomes a picture only by means of the chiaroscuro, which gives faithfulness to the representation, and therefore is of the highest importance to the painter; at the same time it is one of the most difficult branches of an artist's study, because of the want of precise rules for its execution. Every art has a point where rules fail, and genius only can direct. This point in the art of painting is the chiaroscuro. The drawing of a piece may be perfectly correct, the coloring may be brilliant and true, and yet the whole picture remains cold and hard. This we find often the case with the ancient painters before Raphael; and it is one of the great merits of this sublime artist that he left his masters far behind him in chiaroscuro, though he is considered not so perfect in this branch as Correggio and Titian, who were inferior to him in many other respects. The mode in which the light and shade are distributed on any single object is easily shown by lines supposed to be drawn from the source of the light which is shed over the figure; but chiaroscuro comprehends, besides this, aerial perspective and the proportional force of colors, by which objects are made to advance or recede from the eye, produce a mutual effect and form a united and beautiful whole. Chiaroscuro requires great delicacy in conception and skill in execution; and excellence in this branch of art is to be attained only by the study of nature and of the best masters. Chiaroscuro is also understood in another sense, paintings in chiaroscuro being such as are painted in light and shade and reflexes only, without any other color than the local one of the object, as representations of sculpture in stone or marble. There are some fine pieces of this sort in the Vatican, at Rome, by Polidoro da Caravaggio, and on the ceiling of the Paris Bourse by Meynier and Abel de Pujol.

CHIASTOLITE, kī-ăs'tō-līt, a variety of the mineral andalusite, occurring in stout crystals of prismatic aspect, and distinguished by containing carbonaceous impurities that are distributed through the interior according to a geometric scheme, so that a cross section of the crystal presents a tesselated appearance or shows a distinct colored cross. In the United States it is found at Lancaster and Sterling, Mass., and in Canada at Lake Saint Francis. Also called "macle." The name "chiastolite" is derived from a Greek word signifying "arranged diagonally."

CHIAVARI, kyä-vä'rē, Italy, a seaport in the province of Genoa, on the Gulf of Rapallo, 23 miles southeast of Genoa. It has narrow streets lined with substantial houses and open arcades; statues of Garibaldi and Mazzini, attractive public gardens, a technical and nautical school and a gymnasium. Silks, lace and furniture are manufactured, and fishing and trading are carried on. Pop. 13,700.

CHIAVENNA, kyä-vĕn'nä, Italy, a town on the Mera 38 miles north-northwest of Bergamo, in the province of Sondrio, Lombardy. It stands in a valley in the midst of magnificent scenery on the road to the Splügen, and at the junction of two passes through the Alps, and has an important transit trade. Pop. 4,788.

CHIBCHAS, chĕb'-chăs, or **MUSICAS,** a tribe of Indians who, at the time of the conquest of Colombia, occupied the upland country in and around Bogotá. When the expedition under Gonzalo Jiménez de Quesada came into contact with the Chibchas in 1836, after a toilsome, unpleasant and dangerous journey up the Magdalena River, through jungle and forest and over rugged mountains, they were a fairly civilized people living in well-built towns and villages, cultivating the land and carrying on extensive trade and commerçe. An organized government, a highly developed religion, a complicated mythology and a powerful and much venerated priesthood and ruling class bound the Chibchas into a compact nation which was fully aware of its superiority over the other races by which it was surrounded and with which it did business. The Chibchas were skilful artisans, and their work in gold, silver and precious stones was almost the equal of the best of the kind done by the native races of America. In their size, construction and architecture their temples only fell short of the excellence of the sacred edifices of the Peruvians, Aztecs, Mayas and more advanced

races of Guatemala. Though they fought valiantly in defense of their homes and their ruler and priests, the Chibchas were defeated by Quesada and their country renamed by him New Granada (Nuevo Reino de Granada); and their capital city was baptized Santa Fé de Bogotá and dedicated to the service of the king of Spain (1538). At the time of the conquest the Chibchas had amassed vast quantities of gold, which the Spaniards seized. They had considerable scientific knowledge and possessed a hieroglyphic system of writing much like that in use among the neighboring cultured native races. They traded the products of their cold upland country for those of the temperate and hot lands; and they mined emeralds and salt, for which they had a constant and ready market. These are to-day still two of the most important industries of Colombia. The salt and the emeralds from the Chibcha mines were carried down the Magdalena River and distributed all along the neighboring seacoast, and from there carried far into Central America and some of them are believed to have reached the capital of the Aztecs before the discovery of America. The Chibchas also excel in weaving, the tanning of skins and the making of pottery. Their complicated religious system, which was based on nature worship, had much affinity with the various creeds of Central America and Mexico.

CHIBOUQUE, chĭ-book', **CHIBOUK, CHIBUK** (Turk. *Chibuq,* pipe), a long Turkish pipe having generally a wooden stem, an amber mouthpiece and a clay bowl. The stem, which is usually from four to five feet long, is generally wound with silk, cotton or other thread. This is frequently kept wet to cool the smoke of the pipe by evaporation.

CHICA, or **CHICHA,** chē'chä, a South American word having several meanings. (1) A species of *Sterculia,* the seeds of which are eaten in Brazil. They are about the size of a pigeon's egg and have an agreeable taste. (2) A red coloring matter prepared by the Indians on the upper parts of the Orinoco and the Rio Negro from the leaves of a plant native to that region called *Bignonia chica,* and with which they paint their skin, in order to be better able to resist the rays of the sun. It is of a beautiful vermilion color, and, although of a resinous nature, is not liable to become liquid under the influence of heat. It is soluble in alcohol, and stains cotton orange-yellow. It is extracted by boiling the leaves in water, decanting the decoction and allowing it to settle and cool when a red matter falls down, which is formed into cakes and dried. It is also called *carajuru.* (3) A dance popular among Spanish South Americans. It is said to have been introduced into Spain by the Moors, and to have been the origin of the fandango, the chaconne, the cachucha and the bolero and other similar dances known by distinct names in different parts of Spain, which some writers declare to be the chica under a more decent form. It is similar in character to the dance of the Angrismene performed at the festivals of Venus, and still popular among the modern Greeks.

CHICA, chē'kä, **PITO,** pē'tō, or **POSO,** a kind of beer made from maize, in general use in Chile, Peru and other mountainous regions of South America. It was the national drink of the natives long before the appearance of the Spaniards. The most ordinary method of preparing it is to steep the grains of maize until they begin to sprout, when they are exposed to the sun. The malt thus prepared is then ground, mixed with warm water and left to ferment. The beer, when ready, has a dark-yellow color and a pleasant and somewhat bitter and sour taste. It is consumed by the Indians in great quantities. When Chica has been buried for some time in the earth in pitchers it has a violently intoxicating effect.

CHICACOLE, chĭk-a-kōl', or **CICACOLE,** India, a town in the Ganjam district, Madras Presidency, near the coast, about 567 miles northeast of Madras, at one time famous for its fine muslin manufactures. On two occasions, namely in 1791 and 1866, it suffered much from famine, and in 1876 a flood did considerable damage to the town. Pop. 20,000.

CHICAGO, Ill., the second city in the Union, is in Cook County, and lies on the southwestern shore of Lake Michigan. The dome of the courthouse is in north latitude 41° 53′ 2″ and longitude 87° 36′ 47″ W. The city has a shore line on the lake of 24.5 miles and extends 10 miles inland. The city area, 198.997 square miles, covers a great part of the alluvial plain formed by the Chicago and Calumet rivers. The Chicago River is formed by the junction of two small rivers, the north and south branches, thus dividing the city into three portions commonly known as the North, South and West sides, respectively. Calumet River is the outlet by which the shallow sheet of water known as Calumet Lake empties into Lake Michigan. The land on which the city is built is level and lies quite low, the elevation above Lake Michigan being only 25 feet. The two rivers form natural harbors, which have been improved by dredging. The shore of Lake Michigan is broken by few bays or inlets, and harbors are infrequent, and, as a rule, not commodious. Wherever, therefore, a river is found, navigators eagerly use it, so far as its depth permits, as a refuge from the storms of the great lake. Still, rivers so small as these afford inadequate facilities for the commerce of such a city as Chicago has grown to be, and one of the needs of the early future is provision for a commodious harbor, with sufficient depth of water, proper dockage and protection from storms.

Early History.—In the early days of French exploration it was found that the Indians used the Chicago River as one line of travel by which the Mississippi could be reached. Passing up the river and its south branch, a portage of only four or five miles brought the traveler to the Desplaines River, down which his canoe passed to the Illinois River, and so to the Mississippi. This route seems to have been used by white men for the first time in 1673, when Joliet and Marquette, returning from the Illinois River, were shown by the Indians the Chicago portage. It may be that they descended to Lake Michigan by the Calumet. Père Marquette spent the winter of 1674–75 in a cabin on the south branch of the Chicago River, being unable on account of physical weakness to prosecute his journey to the Illinois villages. It was in the following springtime that the devoted missionary died, while endeavoring to make his

way to Mackinac by the east shore of Lake Michigan.

The French seem later to have had a fort at the Chicago portage, although it was probably a mere stockade, and no regular garrison was kept in it. This fort is mentioned by James Logan in his report to the governor of Pennsylvania in 1718, and also in the Treaty of Greenville, 1795. However, the Chicago portage was not much used by the French, as they found other routes of travel safer and more convenient.

About the time of the Revolutionary War a colored man from San Domingo, Jean Baptiste Point de Saible (or au Sable), made his way to the Chicago River and established himself there as an Indian trader. Here, about 1777, he built a house of squared logs which may be regarded as the beginning of continuous settlement at Chicago. This house he sold in 1796 to a French trader, who in turn sold it in 1803 to John Kinzie, the first American settler. The house, known as the old Kinzie mansion, stood on the north bank of the river opposite the site on which Fort Dearborn was later built, and was in existence until 1837.

Kinzie was an Indian trader, and no doubt thought the Chicago a convenient centre for his business. He brought his family to his new home in 1804, the same year in which the fort was built, and thereafter continued his residence there until his death (1828).

Fort Dearborn was a mere stockade, with two blockhouses. The quarters for the garrison were enclosed in the stockade. It was situated on the south bank of the river, not far from the lake. At that time the river took a sharp turn to the south just east of the fort, and made its way into the lake over a heavy sandbar not far from what is now the eastern end of Madison street. The bar was not capable of being crossed by anything larger than a small boat, and the schooner which, in 1804, brought the stores for the garrison had to anchor and land passengers and cargo in boats. The first garrison consisted of one company of infantry (of the First regiment). The site of the fort was on a reservation of six square miles, ceded to the United States by the Indians in Wayne's treaty made at Greenville in 1795.

The settlement at Fort Dearborn made little growth until after the War of 1812. It was far in the wilderness, being reached from Detroit by a trail through the woods, and from Mackinac by lake schooners of which usually two came each year, in spring and fall.

The Massacre of 1812.— In 1812 the second war with Great Britain broke out, and at the outset in the Northwest all the advantage lay with the British and their Indian allies. Mackinac was captured, thus securing to the British the control of the upper lakes, and General Hull, in command at Detroit, sent orders that Fort Dearborn should be evacuated, and that the surplus stores should be divided among the Indians. These orders were executed, and on 15 August the garrison, escorting a number of women and children, set out for Detroit by the road which wound along the lake shore. At a point among the sand hills near the eastern end of the present Eighteenth street the savages attacked in force, and the whole body of whites were captured or destroyed. Two of the women and 12 children were butchered during the fight and a number of the wounded men were killed afterward. The Indians then burned the fort and divided the plunder.

In 1816, after peace was fully restored, Fort Dearborn was reconstructed on a somewhat larger scale than before, and under protection of its garrison a small village slowly grew up.

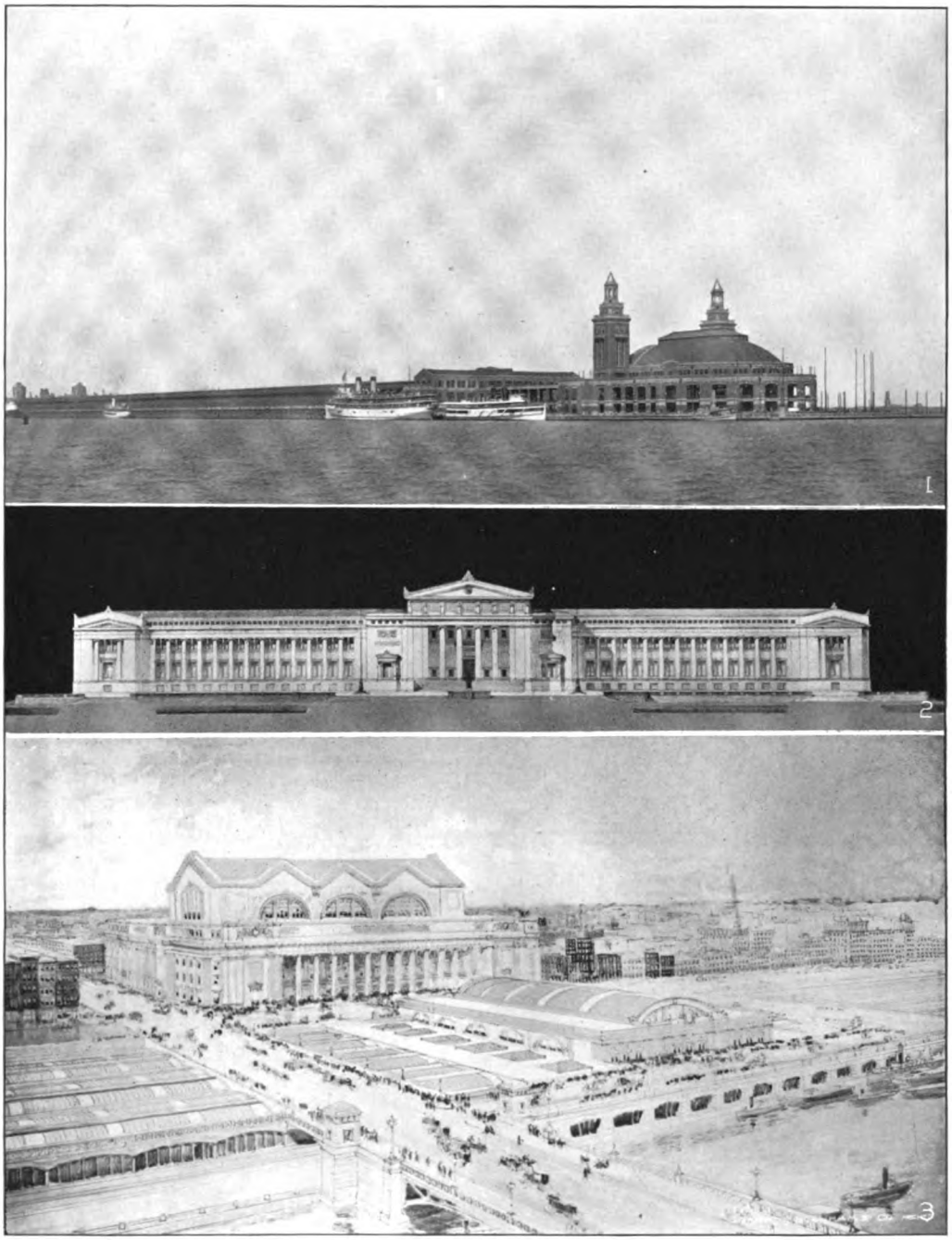
Political Jurisdictions.— In the old days of French and British occupation the territory, including the valleys of the Wabash and Illinois rivers, west to the Mississippi and north to Lake Michigan, was commonly known as the "Illinois Country." The main French settlements were at Vincennes, on the Wabash, at Kaskaskia on the river of that name, and at Cahokia and Fort Chartres, on the Mississippi. In 1763, by the Treaty of Paris, the French government yielded to Great Britain all claim to land east of the Mississippi, and thus the Illinois country became British. By the "Quebec Act" of 1774 — one of the legislative acts of the British government which led to the Revolutionary War — all of the newly-acquired land between the Ohio and the Great Lakes was included in the province of Quebec, thus placing it under the arbitrary military government at that time prevailing over Canada.

In 1778 a small army of Virginia troops sent out by Gov. Patrick Henry, under command of Col. George Rogers Clark, seized Kaskaskia and Vincennes, and thus replaced British authority by American throughout the Illinois country. The treaty of peace of 1783 drew the northern line of the new republic through the Great Lakes, instead of through the Ohio River, as doubtless would have been done had it not been for Clark's victorious expedition, and thus the site of Chicago became finally American and not British. Virginia organized the Illinois country as a county — the county of Illinois — and under that government it continued from 1778 until the cession of all the Northwest by Virginia to the United States, in 1783.

While Clark's expedition determined the exclusion of British authority from the Illinois country, there remained a dispute as to jurisdiction over it among several of the States. Virginia claimed all the territory between the Ohio, the Mississippi and the lakes, on the ground mainly of conquest. New York claimed the same territory, on the ground of a treaty with the Iroquois, who were asserted to have extended their conquests as far as the Mississippi. Massachusetts and Connecticut claimed, under their original charters, to own all the land between their northern and southern boundary lines of latitude west of New York as far as the Mississippi. Under these various claims Chicago is in territory claimed respectively by Virginia, New York and Connecticut. The conflicts were settled by acts of cession on the part of the various States to the United States.

After the Virginia act of cession of 1783 the authority of that State was withdrawn from the Illinois country and for several years the French villagers were a law unto themselves. In 1787, however, the ordinance for the government of the Northwest Territory was enacted by Congress, and thus the Chicago area came legally into that Territory. In 1790 Governor St. Clair visited Kaskaskia and formed Saint Clair County from the southwestern portion of the Illinois country. The wilderness north of that had practically no white population, and

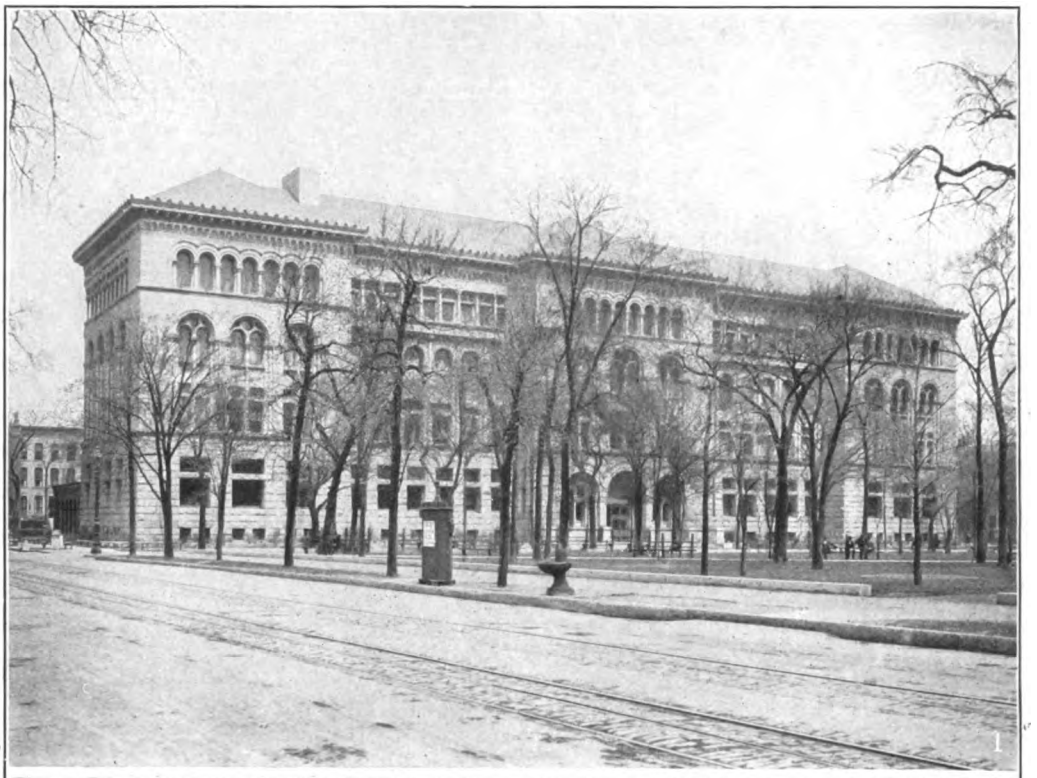
CHICAGO, ILL.



1 Municipal Pier

2 Field Museum of Natural History

3 Chicago Union Passenger Station



1 Newberry Library

2 Auditorium and Annex

hence no local government was needed. In 1796, however, the county of Wayne was organized, which included Detroit and the Chicago area. It was in this year that the British finally withdrew their garrisons from Detroit, and the new county was named from the victor over the Indians in the campaign of 1794, who also made the Treaty of Greenville in 1795. In 1800 the Indiana Territory was organized, in which all the Illinois country was included, and in 1809 the Illinois Territory was created, including all west of the Wabash River and north to British America. When the boundaries of Wayne County were changed, in 1803, the Chicago area was left out, and it was not included within any county until 1812, when the county of Madison was formed. Under the laws of the Territory of Illinois, Chicago was included in Edwards County in 1814, and in Crawford County in 1816. In 1818 Illinois was admitted to the Union as a State. Under the laws of the State Chicago was successively included in Clark County, organized in 1819; in Pike County, 1821; in Fulton County, 1823; in Peoria County, 1825; and finally in Cook County, organized 15 Jan. 1831.

The ordinance of 1787 seemed to indicate that a State in the northern part of the Northwest Territory west of Lake Michigan should have as its southern boundary a line drawn east and west through the southern extremity of that lake, and the bill for the admission of Illinois was originally drawn accordingly. Mr. Nathaniel Pope, delegate in Congress from the Territory, however, succeeded in having the bill amended so as to secure the present northern boundary for Illinois. Had this not been done Chicago would be in the State of Wisconsin.

Origin of the City.— In 1830 Chicago was a hamlet of log houses inhabited by something less than a hundred people. These log houses were nearly all on the North and West sides. The beginning of the city as a prosperous town was due to the Illinois and Michigan Canal, authorized by act of Congress in 1827. By this act the State was granted alternate sections of land on both sides of the canal route, and the canal commissioners proceeded to lay out towns and sell lots in order to secure funds. One of these towns was Chicago, at the eastern terminus of the canal, and the lands platted therein were sold in 1830. The town was bounded on the east by State street, on the north by Kinzie street, on the west by Desplaines street and on the south by Madison street. Buildings began to be erected and slowly immigration began to come. The early settlement of Illinois had been in its southern counties and was derived mostly from southern States. The new migration, beginning with 1830, came in the main by way of the lakes and was largely from the east, New York and New England being especially represented. In 1833 Congress made an appropriation for a harbor at Chicago. Piers were built out into the lake, a channel was cut through the old sandbar and the spring freshets sufficed to scour it out. It was in 1834 that, for the first time, a schooner sailed up the river. By 1837 the town had grown to have a population of 4,170, and in that year it was incorporated as a city.

Early Railroads.— The canal, from which so much was expected, did not prove the wonderful success that was hoped. It was not finished till 1848. Meanwhile, however, railroad construction began and opened up the prairie interior of the State, while the application of steam to navigation made it comparatively easy to transport passengers and freight between Chicago and Buffalo. In 1849 the Galena and Chicago Union Railroad (the beginning of the present Chicago and Northwestern) was put in operation and in 1852 the Michigan Southern and the Michigan Central railways from the east reached Chicago, and others speedily followed in all directions.

Population and Area.— The growth of the new city in population, slow at first, finally became very great. Chicago is now the second city in the United States in population. The area was extended also by successive annexations of contiguous territory. Between 1837 and 1915 the city's area increased from 2.55 to 198.997 square miles. The 4,170 people of 1837 became 4,479 in 1840, 28,269 in 1850, 109,206 in 1860, 298,977 in 1870, 503,298 in 1880, 1,099,850 in 1890, 1,698,575 in 1900, 2,185,283 in 1910 and the United States census bureau of 1915 estimated the population of the city at 2,447,045. Chicago has a very large foreign population. In 1910 there were 781,217 (35.7 per cent of the total population) foreign born persons in the city. Among this number were 182,281 persons born in Germany, 121,786 in Russia, 132,059 in Austria-Hungary, 65,463 in Ireland and 63,035 in Sweden. There were also 705,109 persons of native birth with foreign parentage. Only 20.4 per cent of the population, 445,139 persons, were native born of native parentage. The negro population in 1910 was 44,103, about 2 per cent of the total.

The Great Fire of 1871.— The year 1871 was memorable for the great fire which swept a large part of Chicago from the earth. Beginning at a little before 9 o'clock on Sunday evening, 8 October, in a small barn on the West side, the flames spread through all the three sections of the city, and were not finally extinguished until Monday night, 9 October, at 10 o'clock, when a welcome rain fell. The main business and residence portion of the city was devastated. The total area of the burnt district was 2,024 acres, nearly three and a third square miles, and the value of the property destroyed was estimated at $187,000,000. The loss of life can only be conjectured — perhaps it amounted to 300 persons. The destitution which for a time fell upon the city was relieved with lavish generosity from all parts of this country and of Europe.

This appalling disaster did not daunt the people of Chicago. They began at once to rebuild the city and to reconstruct business. While many insurance companies were obliged to suspend, still some $46,000,000 were realized from this source, and fortunately the bank vaults in every instance but one were found to have preserved their contents intact. Within two years the burnt area was again covered with buildings, and of a more solid type than before the fire.

The Columbian Exposition.— In 1892–93 a World's Fair was held in Chicago, to commemorate the discovery of America four centuries before. An act of Congress, passed in the spring of 1890, authorized an international exposition in Chicago as an illustration of the

development of the new world which Columbus found, made appropriations for the share of the United States government, and provided for a national commission to supervise the work. In Chicago a corporation was formed under the laws of Illinois, to undertake the practical details. Funds were provided from private subscriptions to the stock of the exposition company, from a loan of $5,000,000 made by the city, the proceeds of which were devoted to the exposition, from a special appropriation by Congress, from gate receipts and from various concessions. The site was Jackson Park and the Midway Plaisance, an area of 666 acres being included, with a frontage of two miles on Lake Michigan. Buildings were erected on an elaborate scale, and with taste which met wide approval. J. L. Olmstead planned the landscape work and the architectural work was done by Daniel Burnham and other leading architects. The great building devoted to manufactures had a ground area of nearly 31 acres and a floor and gallery space of 44 acres. In the central hall 75,000 people could be seated, while the entire building would seat 300,000. The standing army of Russia might have been drawn up under its roof. The entire cost of the fair was estimated at upward of $43,000,000. The number of paid admissions throughout the six months from May to November was 21,500,000, the whole number of admissions being 27,529,401.

Chicago and the Federal Government.— In Chicago are held United States courts as follows: The Circuit Court of Appeals and the Circuit Court of the seventh judicial circuit, and the District Court of the northern district of Illinois.

The Chicago post office includes the central office, 47 carrier stations, 4 stations without carriers and 302 substations. There are 3,898 employees in the main office and stations and 2,051 carriers and collectors. The receipts for the year 1915 were $23,495,730.76. During the same period the pieces of mail handled numbered 981,037,196 first-class and several million of second-class matter.

By the apportionment under the census of 1910 Illinois has 27 members in the House of Representatives. Six of the Illinois Congressional districts lie wholly in Chicago and four more are partly in Chicago. Two representatives in Congress are elected in the State at large, as the legislature has not redistricted the State on the basis of the last census.

The port of Chicago showed vessels entered for the year 1915 to be 5,055, of a registered tonnage of 7,739,174, while the number cleared for the same period was 5,097 vessels of a tonnage of 7,834,152.

Of the lake commerce of Chicago in 1915, 8,409,573 tons were received or shipped from the Chicago River, and 7,163,753 tons at the Calumet River. Practically all of the commerce of the Calumet River consisted of iron ore amounting to 4,414,964 tons, as compared to 2,403,916 tons received at Gary during the same period, and 1,133,193 tons of both hard and soft coal. The lake commerce of Chicago has slightly declined during the past decade, even though there has been a large increase of tonnage received and shipped from the Calumet harbor, at the south end of the city. This is largely due to the obstructions in the Chicago River by bridges and to the crookedness of the river. The city has recently completed a $5,000,000 pier extending 3,000 feet into the lake for the use of passenger boats and package freight. In 1915 the amount of package freight received at the Chicago River amounted to 824,754 tons and the shipments were 432,678 tons. The receipts of the Chicago customhouse for 1914 were $9,147,600. The internal revenue receipts for the same year were $15,947,189.89, or a total of $25,094,789.89.

Chicago and the Government of Illinois. — The general assembly of the State of Illinois numbers 51 senators and 153 representatives, one senator and three representatives being elected from each district. Of these districts 14 are wholly and 4 partly in the city of Chicago.

The Supreme Court of Illinois consists of seven judges elected one in each of seven districts for a term of nine years. Chicago is in the seventh judicial district. The five counties composing that district had in 1910 a total population of 2,618,847, of which Chicago had 2,185,283.

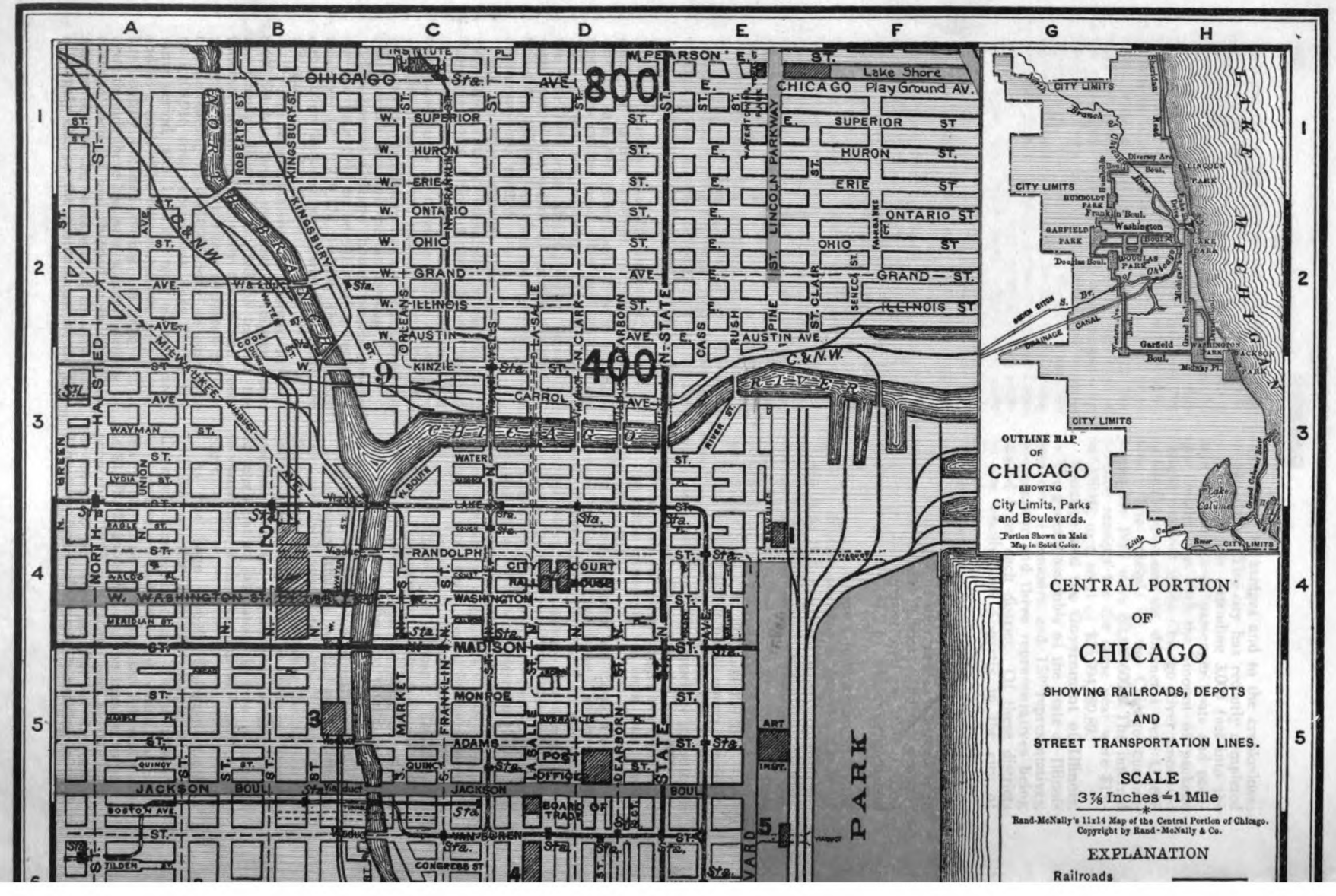
Cook County forms a judicial circuit of the State of Illinois, and has a Superior Court of 18 members and a Circuit Court of 20 members. These courts have concurrent jurisdiction in law and equity. The members are elected for a term of six years by the voters of the county. The population of Cook County, outside of Chicago, in 1910 was 219,050.

Three judges of the above courts are designated by the Supreme Court of the State to sit as an appellate court, with appellate jurisdiction over the Circuit, Superior and County Courts. In like manner six other judges are designated by the same authority to form two branch appellate courts.

The Criminal Court of Cook County is formed by the judges of the Circuit and Superior Courts, who alternate in the dutv of holding such court. One judge of the Circuit Court is also assigned to hold the Juvenile Court, which has jurisdiction under the act to regulate the treatment of dependent, neglected and delinquent children. Cook County also has a County Court and a Probate Court, each consisting of one judge, elected by the people of the county, for a term of four years. All these courts sit in the city of Chicago. The Municipal Court, consisting of a chief justice and 30 associate justices, takes the place of the old system of justices of the peace, and is in a very real sense the people's court, having civil and criminal jurisdiction of a primary nature.

The administration of the court provides for specialized courts, such as the boys' court, dealing with offenders between the ages of 17 and 21, the morals court, the court of domestic relations and the automobile speeders' court. A psychopathic laboratory is also maintained in connection with the criminal branch of the court.

As has been noted, Chicago contains 2,185,283 of the 2,405,233 people of Cook County — almost the total. The taxable value of property in Cook County, which, by State law, is one-third of the assessed full real value, is $1,078,824,261 (1914). The taxable value of property (1914) in Chicago was $1,000,797,060, or over 90 per cent of that of the county. Moreover, many of the people residing in Cook


CENTRAL PORTION
OF
CHICAGO
SHOWING RAILROADS, DEPOTS
AND
STREET TRANSPORTATION LINES.
SCALE
3⅞ Inches = 1 Mile
Rand-McNally's 11x14 Map of the Central Portion of Chicago.
Copyright by Rand-McNally & Co.
EXPLANATION
Railroads
OUTLINE MAP
OF
CHICAGO
SHOWING
City Limits, Parks
and Boulevards.
Portion Shown on Main
Map in Solid Color.
CHICAGO RIVER
PARK
LAKE MICHIGAN
CITY LIMITS
Lake Shore
Play Ground Av.
CHICAGO AVE
SUPERIOR
HURON
ERIE
ONTARIO
OHIO
GRAND
ILLINOIS
AUSTIN
KINZIE
CARROL
WATER
LAKE
RANDOLPH
CITY COURT HALL HOUSE
WASHINGTON
MADISON
MONROE
ADAMS
POST OFFICE
JACKSON BOUL
BOARD OF TRADE
VAN BUREN
CONGRESS ST
W. WASHINGTON ST.
NORTH HALSTED
MILWAUKEE
KINGSBURY
ROBERTS ST
ORLEANS
LA SALLE
N. CLARK
DEARBORN
N. STATE
CASS
RUSH
PINE
ST. CLAIR
SENECA
LINCOLN PARKWAY
FAIRBANKS
AUSTIN AVE
C.&N.W.
Sta.
800
400
9
2
3
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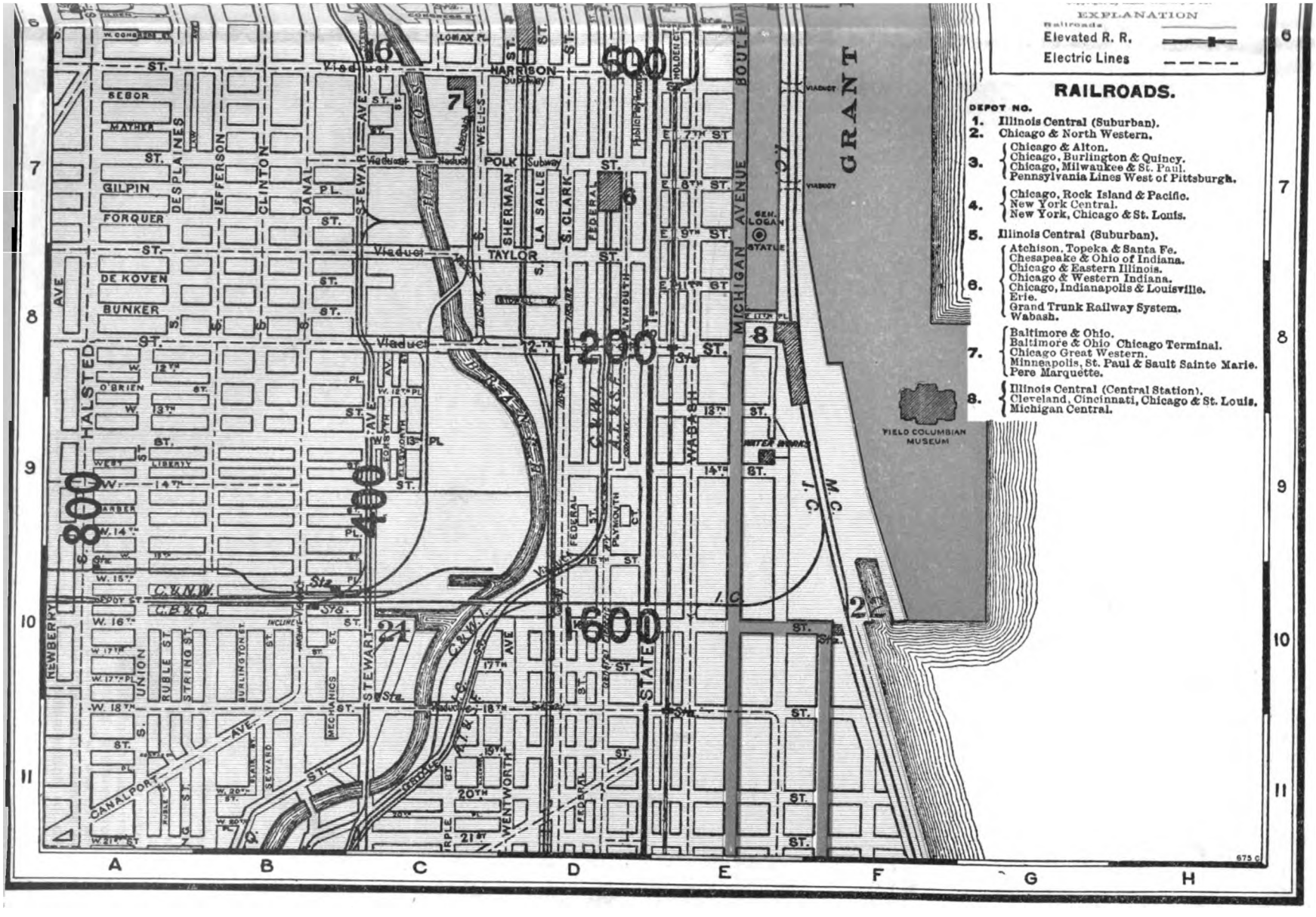
EXPLANATION
Railroads
Elevated R. R.
Electric Lines
RAILROADS.
DEPOT NO.
1. Illinois Central (Suburban).
2. Chicago & North Western.
3. Chicago & Alton.
Chicago, Burlington & Quincy.
Chicago, Milwaukee & St. Paul.
Pennsylvania Lines West of Pittsburgh.
4. Chicago, Rock Island & Pacific.
New York Central.
New York, Chicago & St. Louis.
5. Illinois Central (Suburban).
6. Atchison, Topeka & Santa Fe.
Chesapeake & Ohio of Indiana.
Chicago & Eastern Illinois.
Chicago & Western Indiana.
Chicago, Indianapolis & Louisville.
Erie.
Grand Trunk Railway System.
Wabash.
7. Baltimore & Ohio.
Baltimore & Ohio Chicago Terminal.
Chicago Great Western.
Minneapolis, St. Paul & Sault Sainte Marie.
Pere Marquette.
8. Illinois Central (Central Station).
Cleveland, Cincinnati, Chicago & St. Louis.
Michigan Central.
GRANT
FIELD COLUMBIAN MUSEUM
GEN. LOGAN STATUE
WATER WORKS
HARRISON
POLK
TAYLOR
HALSTED
STATE
MICHIGAN AVENUE
BOULEVARD
STEWART AVE
CANALPORT AVE
WENTWORTH
WABASH
PLYMOUTH
FEDERAL
SHERMAN
LA SALLE
S. CLARK
WELLS
CLINTON
JEFFERSON
DESPLAINES
CANAL
UNION
RUBLE ST.
STRING ST.
BURLINGTON ST.
MECHANICS
SEWARD
NEWBERRY
SEBOR
MATHER
GILPIN
FORQUER
DE KOVEN
BUNKER
O'BRIEN
WEST LIBERTY
BARBER
LOMAX PL.
HOLDEN CT.
E 7TH ST
E 8TH ST
E 9TH ST
E 11TH ST
E 12TH PL
W. 12TH PL
W. 13TH ST
W. 14TH ST
W. 15TH ST
W. 16TH ST
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675 C

County outside the limits of Chicago have their business in the city. From these facts it is plain that Cook County is largely identical with Chicago.

The affairs of the county are administered by a county board of 15 members, elected for a term of three years. Ten are elected in the city and five from that part of the county outside the city. The president of the board is designated by the people at the election for commissioners.

The City Government.— The city is incorporated under the general laws of the State for municipal corporations. The constitution of Illinois forbids special charters for corporations, and the statutes provide in detail a scheme of government for cities.

Local legislation and general administrative oversight are vested in the city council. This body consists of 70 aldermen and the mayor. Each of the 35 wards elects two members for a term of two years. One-half of the members of the council are chosen each spring. The mayor presides over the council.

The mayor is the administrative head of the city. He is chosen by popular election for a term of four years. He has the veto power over all ordinances passed by the council and may veto separate items in the budget. The city council may, however, by a two-thirds vote, override the mayor's disapproval. The mayor has directive control over the administrative departments. He appoints the heads of departments, subject to the approval of the council. All other employees of the city government, except about 400 employed principally in the law department, are under the merit system.

The city treasurer and the city clerk are elected by the people. The main administrative departments are those of finance, law, public works, police, fire, health, public service, buildings, local improvements, municipal courts and public welfare. The board of education, the public library and the municipal tuberculosis sanatarium have special taxes levied for their support, but are, strictly speaking, departments of the city government. Each of the administrative departments has a single head, except the library, educational system, house of correction, board of local improvements for the construction of street improvements by special assessment and the municipal tuberculosis sanatorium, which are administered by boards appointed by the mayor. The city budget is made annually by the city council and the same body levies a tax to meet the greater part of the expenses. Water rates provide the cost of water supply. A very large proportion of the city's revenue, practically one-half, is derived from licenses.

The board of education forms a branch of the city government. The 21 members are appointed by the mayor, subject to the approval of the city council. Seven are appointed each year for a term of three years. The city council at the request of the board of education levies an annual tax on city property for the maintenance of the school system. The tax for the operation of the schools may not exceed 1.2 per cent on the assessed value of property. An additional tax, usually one-half of 1 per cent, is levied for the purchase of sites and the construction of new buildings. In 1915 the school board received in taxes $14,536,608.63, of which $10,043,883.73 were levied for the operation of schools and $4,492,724.90 for new buildings and sites. Besides revenue from taxes, the board of education received on leases of school property and from other sources, in 1915, $1,760,893.44. The total income of the school board annually amounts to over $16,000,000. The public schools offer free education through all grades up to and including the high schools, and the law makes elementary education required. The board of education also maintains the Chicago Normal School for the training of teachers. There are 23 high schools with an enrolment of more than 23,000 pupils, and 284 elementary schools. Students finishing the high school course are prepared to enter college. The total enrolment of pupils in the public schools in 1915 was 317,004, with 7,865 teachers.

The Park System.— The parks of Chicago are in the main under control of three boards, one for each of the three sections of the city. These boards are municipal corporations, created under State law and are independent of the city government. The members of the Lincoln Park board on the northside and those of the West Park board are appointed by the governor of the State. The members of the South Park board are appointed by the judges of the Circuit Court of Cook County. There are also a number of smaller park boards in the outlying sections of the city and the city (corporate) itself also has under its control many playgrounds and bathing beaches. The park system forms a girdle around the central portion of the city from Lincoln Park on the north shore to Jackson Park on the lake shore at the south. The various parks are connected by a series of boulevards. The total area of parks was 3,915.4 acres in 1915. There were also 74.25 miles of parkways and boulevards. Funds for the parks are obtained by taxes levied by the boards on the property within their respective districts and by the sale of a limited amount of bonds.

Chicago has been greatly interested in the development of small parks varying in size from less than 10 acres to 75 acres, scattered through the congested portions of the city and equipped with gymnasiums, swimming pools and assembly halls. The equipment is in constant use throughout the year and the parks serve as neighborhood community centres. There are 24 such parks and many other smaller playgrounds.

A metropolitan park district was created in 1913 by an act of the State legislature providing for the acquisition of forest areas in and near the city. Several large tracts aggregating 5,000 acres have already been purchased. The proposed forest preserve area forms a ring around the city and lies just outside of the present city limits.

The Chicago Sanitary District.— The Chicago sanitary district was authorized by act of the State legislature in 1889, ratified by vote of the people in the same year and organized in 1890. The water supply of the city is taken from the lake, being pumped into the mains from a series of stations at varying distances from the shore. The city drainage also was of necessity carried into the lake, either directly or by way of the river. Contamination of the

water supply it was hoped to avoid by carrying the pumping stations farther into the lake than it was supposed the sewage outflow would go without purification by air and sun. As the city grew, however, it became manifest that the lake water was dangerous to health, and in the end the plan was devised of cutting a canal between the south branch of the Chicago River and the Desplaines River, with a pumping plant capable of turning the water of the south branch into the canal. Then, by connecting all the sewers with the river, it was intended to convert the city drainage into the Desplaines. As all parts of the city could not be included in the new drainage area, and also as a great part of that area must be outside the city limits, a drainage district was created known as the Chicago sanitary district. The construction and management of the canal within that district was entrusted to a board of nine trustees, elected by the people. Funds were provided by bonds of the district and by taxation. The total cost of the work has been over $66,000,000. Earth was broken 3 Sept. 1892, and the water of the lake was turned into the canal 2 Jan. 1900. Since that date it may be noted that the Chicago River no longer flows into Lake Michigan. Its waters now reach the Mississippi. The sanitary district as originally created comprised all of Chicago north of 87th street and some 43 square miles north of Cook County outside of Chicago. The assessed value of taxable property in the district is $1,098,037,554, of which $1,000,797,060 belong to that portion within the city — a percentage of 90.2. By law the board was authorized to effect loans to the amount of 5 per cent of the value of the taxable property in the district, provided that the total should not exceed $15,000,000. The tax levy of the district must not exceed one-half of 1 per cent of the assessed value of taxable property in the district.

By the statute of 1903 large additions of territory were made to the sanitary district so as to protect the lake water both north and south of the original area and the district now has an area of 386 square miles, of which 198,997 miles are in the city of Chicago. Subordinate canals have been cut in each of these territories, connecting ultimately with the main canal. The north shore channel is about eight miles long and the Sag Channel still incomplete, to drain the Calumet region, will be 16 miles long.

The main channel of the canal from river to river is 28.05 miles long. The width on the bottom varies from 110 to 202 feet. The minimum depth of the water is 22 feet. A project for a navigable waterway from Lake Michigan to the Mississippi River was started by the appropriation of $5,000,000 by the Illinois State legislature in 1915. The State waterway will connect with the sanitary canal at Joliet and provide for an 8-foot channel to Utica. It is proposed later to complete this work to the Mississippi River.

The sanitary district has established at Lockport an electric generating plant at which electric power is created by the water passing through the sanitary canal. The city street lights are supplied with current from this water power plant. In 1915, 28,123 lights were thus supplied. The sanitary district also sells electricity to commercial users to a limited extent. The hydro-electric plant is the largest publicly owned electric light plant in the country, and on the whole has been quite successful. Prior to the building of the sanitary canal the death rate from typhoid in Chicago was very high, but now it is one of the lowest in the country.

Public Works.— The city department of public works has charge of the paving, repair and cleaning of streets and alleys, of the construction and maintenance of sewers and of the city waterworks. There are in the city approximately 3,094.44 miles of streets, of which 2,059.34 miles are paved, and 1,592.07 miles of alleys. This is exclusive of the many miles of parkways and boulevards under the care of the various park boards. The city sewers empty into the drainage canal which diverts the city's refuse from the lake.

The waterworks system, which has cost up to 1915 $61,697,000, is owned by the city. The plant has largely been built out of the annual revenue which in 1915 amounted to over $6,500,000, an amount sufficient to cover the cost of the supply and to make extensions to the plant. The pumping stations provided the city during the year with about 213,000,000,000 gallons of water. The per capita use is 236 gallons per day — more it is said than in any other city of the country. The number of miles of pipe was 2,641 in 1915.

The City Library.— The Chicago Public Library contains 627,619 volumes. The main library building on Michigan avenue between Randolph and Washington streets, cost $2,000,000. The income of the library board (the members of which are appointed by the mayor) is about $425,000, mainly derived from taxation. The library maintains 33 branch reading-rooms and 109 delivery stations in different parts of the city. The T. B. Blackstone Memorial Branch Library is an Ionic building of granite and marble, with shelving capacity for 25,000 books.

The City Corporate.— The city corporate, that is, the city exclusive of the board of education, public library, park boards and the Municipal Tuberculosis Sanitarium, has a total ordinary revenue of about $30,000,000 per year. This is also exclusive of the amount received for waterworks, for the payment of local improvements by special assessment, and other special trust funds, such as the amount received by the city from the operation of street railways which amounts to almost $3,000,000 per year. The gross public debt of the city of Chicago in 1915 was $31,924,600.

Institutions of Private Endowment.— The public spirit of Chicago citizens is manifest in many institutions endowed by private munificence for the public good.

The Chicago Art Institute is devoted to maintaining an art gallery and to conducting education in art. The museum contains excellent examples of the old masters and of modern painters, besides sculptures, etchings, engravings and many other appropriate art-objects. The enrollment in the school is over 2,900 in all branches. The Ryerson Library of Art, a beautiful wing of the main building, contains about 8,000 volumes. It also contains extensive and valuable collections of photographs and slides.

The Newberry Library has an endowment of $2,500,000 and occupies a building valued at

$500,000. The library, used wholly for consultation, has 356,033 books and pamphlets.

The John Crerar Library has an endowment of $3,400,000. The books, which are confined to branches of science, number 348,500, besides 115,000 pamphlets, all used for consultation only.

The library of the Chicago Law Institute, which has quarters in the county courthouse, numbers 55,000 volumes.

The Chicago Historical Society has a collection of 40,000 books and 75,000 pamphlets, besides other material relating to the history of the Central West.

Higher education is represented by the University of Chicago, by the professional schools of Northwestern University, by the Medical School of the University of Illinois, by the Loyola University, by the Armour Institute and the Lewis Institute and by various independent schools of law and medicine.

The University of Chicago (q.v.) opened its doors for instruction in 1892. The buildings are situated on the South Side, fronting on the Midway Plaisance, one of the south parkways. Its assets amount to about $50,000,000. The enrolment of students in 1915–16 numbered 8,510. The university consists of graduate schools and colleges of arts, literature and science, a divinity school, a law school, a medical school, a professional school for teachers, and of various other activities, including a press department, which publishes both books and periodicals.

Northwestern University maintains in the city its schools of medicine, law, pharmacy, dentistry and commerce. The College of Liberal Arts and Graduate School, the College of Engineering and the School of Music are in Evanston. The total assets of the university, including grounds and buildings, amount to $10,500,000. The total number of students in all departments (1915–16) was 5,293, and the members of the faculties numbered 452.

Loyola University was organized in 1909. It had in 1915–16 127 instructors and 1,542 students. The Bennett Medical College is affiliated with this institution.

The Lewis Institute is a polytechnic school on the West Side. It was opened for instruction in 1895, the endowment at that time amounting to $1,600,000. The enrolment for 1915–16 included 3,280 students.

The Armour Institute, on the South Side, is also a polytechnic school. The endowment amounts to $4,500,000, and the enrolment of students, 1915–16, was 1,424.

The Field Columbian Museum (q.v.) is an outcome of the Exposition of 1893. The museum was incorporated in that year, and was at the outset encircled by many of the most valuable exhibits which had been made at the Exposition. The original endowment of $1,250,000 was the gift in large part of one citizen. Large acquisitions have been made, especially in the fields of American ethnology. The collections are at present housed in one of the remaining Exposition buildings, in Jackson Park. By the will of the founder, the late Marshall Field, $8,000,000 was left to the museum for a suitable building, which is now under construction as part of the project for the beautification of the Lake Front.

Churches.— Religious organizations number some 1,150 churches and missions.

Business.— Manufactures and commerce form the basis of Chicago's prosperity. With the development of the West and the extension of railroads the industries of the city have grown to enormous magnitude. The manufactures of iron and steel, the agricultural implement works and the beef and pork packing are among the largest. The recepits of live cattle at the Union Stock Yards for the year 1915 were 3,262,752, of sheep 3,510,015, and of hogs 7,652,071. The total value of all live stock received at the Union Stock Yards in the year 1915 was $370,938,156. The Chicago elevator warehouses have a capacity of 50,426,000 bushels of grain.

The census of 1910 records (for 1909) 9,656 manufacturing establishments for Chicago, with a capital of $971,841,000, an average number of 293,977 wage earners, salaries and wages amounting to $240,037,000, and a product valued at $1,281,313,000. The value of manufactured products in 1904, amounted to $955,036,000 — an increase of $326,277,000, or 34 per cent in this five year period. This product actually turned out has no necessary relation to the amount of sales for that year.

Chicago is an important railway centre, besides being favorably situated on Lake Michigan for marine commerce through the Great Lakes. Twenty-three through lines of railroad have terminals in the city. There are no roads passing through Chicago. It is necessary, therefore, for transfers both of freight and passengers to be made from one line to another. This greatly complicates the transportation system of the city, and among the vital improvements of the near future should be a complete reorganization of these matters, in aid of saving time and labor and cost both for freight and passengers. The old Illinois and Michigan Canal connecting Chicago with the Mississippi River of course is obsolete, but the Drainage Canal may be made the means of connection under modern conditions, providing an adequate amount of work is done on the Illinois River, so that freight may pass directly from the Great Lakes system to the Mississippi system of water transportation.

The Plan for a More Beautiful and Convenient City.— Chicago, like most other cities, has grown to an extent entirely unforseen at the outset, and on lines resulting from circumstances and conditions of the locality. The original reason for the settlement was the location in the vicinity of a harbor of Lake Michigan and near the carrying place between the waters of that lake and the affluents of the Mississippi. The ground was flat and marshy, being therefore in many ways entirely inconvenient for city building. As population increased streets extended toward the north and south along the shores of the lake, and westward over the prairie. It was very difficult to provide suitable pavements for the streets and at the same time suitable foundations for large buildings. Such buildings have had to be erected on piles, which originally did not go down deeper than a clay sub-stratum. In later years concrete piles have been carried down to the bedrock. There was a time when it became necessary to grade the streets up, and this involved the correlative necessity of lifting the

buildings along these street lines. In the main, streets have been made at right angles, with an occasional diagonal following the line of some old highway leading out into the State. On the south side the Illinois Central Railroad occupies the lake shore for several miles, thus preventing ready access to the beach and largely cutting off the city from the use of the lake.

After the World's Fair of 1893 serious study was given to the question of a possible re-creation of city lines in such a way as to secure further development in accordance with fundamental principles of beauty and advantage. The Commercial Club of the city appointed a Commission of 28 of its members, and the Mayor of the city also appointed a very large committee of citizens, to consider the same question. This was in 1909. After careful study a systematic plan was evolved looking toward the re-creation of the lines of city growth in a very important way. It was suggested that the heart of the city should be connected in a systematic manner with the surrounding districts by two great arterial systems, rectangular and diagonal. Certain existing streets should be widened and made the main arteries of commerce. It was further proposed to extend the park system by completing the existing park belt, by securing another system of parks more remote from the present settled area and by adding a considerable number of small parks. In order to complete the existing park system the plan contemplates filling in shallows on the South Side between the centre of the city and Jackson Park, thus creating a system of islands which are to be improved and connected by bridges, leaving a waterway of lagoons between this new parkway and the mainland. The lake front on the North Side is now being improved by an extension of Lincoln Park on made land. When this extension is completed the lake frontage on the north side of the river for eight miles will be parked or boulevarded. The plan also contemplates reconstructing the location of the railway passenger stations and freight-yards in such way as to facilitate as much as possible the removal of freight-yards from the centre of the city, and at the same time making communication convenient and rapid for railway passengers. This last of course involves a complete subway traction system. The plan also involves the creation of a civic centre for the main administrative buildings, so situated as to be easy of access from all parts of the city.

This plan is a very extensive one, and of course will require many years to carry to completion. At the same time, when completed it will make the city far more beautiful, and far more convenient, and will provide for its future development in a way that is systematic rather than haphazard. The City Beautiful will become also the City Comfortable.

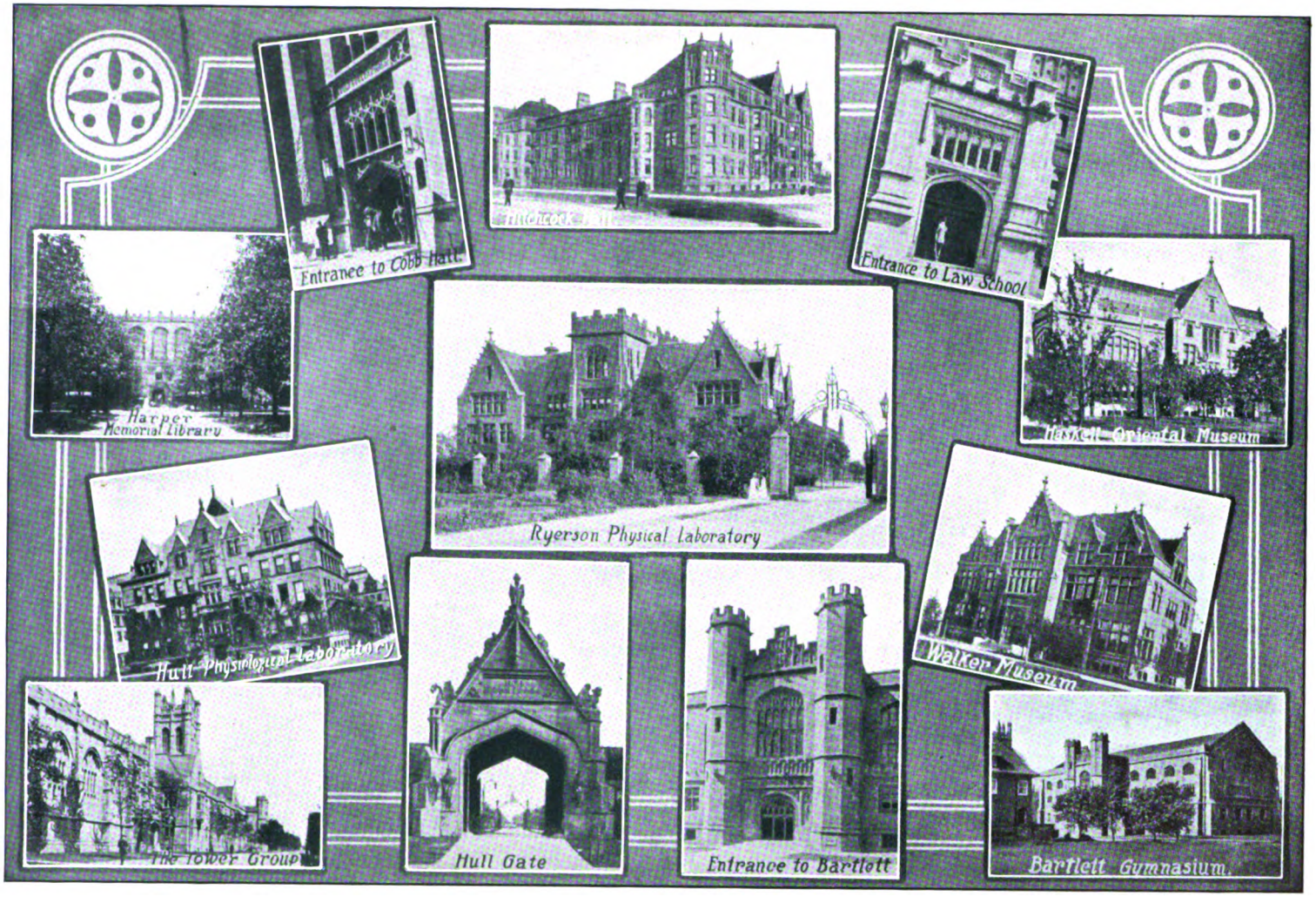
Bibliography.— Moses, 'Illinois, Historical and Statistical'; Andreas, 'History of Chicago'; Blanchard, 'History of Illinois and Chicago'; Moses and Kirtland, 'History of Chicago'; Annual Report of Trade and Commerce; Board of Trade City of Chicago Quarterly Statistics; Comptroller's Annual Report; Report of the South Park Commissioners; Report of the Lincoln Park Commissioners; Report of the West Park Commissioners; Chicago Daily News Almanac; annual reports of various institutions.

HARRY PRATT JUDSON,
President of the University of Chicago.

CHICAGO, University of, located at Chicago, Ill. A Baptist institution known as the University of Chicago was founded in 1857, and was compelled to close its work in 1886. Shortly after the closing of that institution, a movement for the founding of a large university was begun by the American Baptist Education Society at the suggestion of John D. Rockefeller (q.v.). The present university was chartered in 1890, and opened to students in 1892; Mr. Rockefeller contributed the larger part of the original endowment fund to which he has since added gifts amounting to about $40,000,000. The university was organized under the leadership of William R. Harper (q.v.), who was its president until his death, and largely directed and controlled its administrative and educational policy. In accordance with the charter, the president and two-thirds of the trustees must be members of a Baptist church, but there is no denominational control.

Seal of the University of Chicago.

The university includes the following departments: (1) the Schools, Colleges and Academies; (2) the University Extension Division; (3) the University Libraries, Laboratories and Museums; (4) the University Press; (5) the University Affiliated Schools. The Schools, Colleges and Academies include: (1) the Schools, which are the Divinity School, the Ogden (Graduate) School of Science, the School of Education, the Law School and the Medical School (partly organized); the School of Technology, the School of Fine Arts and the School of Music are yet to be established; (2) the Colleges, the College of Arts, the College of Literature, the College of Science, the College of Commerce and Administration and the University College and College of Education; (3) the Academies, the University High School, directly under University control and numerous other secondary schools affiliated with the University. Each College is divided into a Junior College and a



CHICAGO UNIVERSITY

Senior College, the former including the first half of the curriculum, corresponding to the work of the usual college Freshmen and Sophomore years, the latter the work of the Junior and Senior years. The academic year for all departments is divided into four quarters of 12 weeks, and each quarter into two terms of six weeks each; the courses are arranged with the work of 12 weeks or six weeks as a unit, and students may enter upon their work at the beginning of any quarter, and may be absent from the university during any quarter they desire. The summer quarter has a large attendance of teachers, and others outside the regular student body, but an increasing number of regular students continue their work in the summer. Instructors from other universities are added to the staff for this quarter. The courses are classified as majors and minors, a major course requiring four to five hours of classroom work for 12 weeks, a minor four to five hours classroom work for six weeks; the regular work of a student during each term of a quarter is three minors or the equivalent. The Colleges of Arts, Literature and Science confer the degree of A.B., Ph.B. and S.B. for the completion of the full work of the Junior and Senior Colleges; the College of Commerce confers the degree of Ph.B. The work of the Junior Colleges is largely prescribed for each degree; the work of the Senior Colleges of Arts, Literature and Science is elective, with the limitation that the student may not elect more than half his work from any one department; the electives are further limited by the degree to be received. The work of the Senior College of the College of Commerce and Administration is divided into four divisions: (1) Business; (2) Business Teaching; (3) Secretarial; (4) Philanthropic Service. The University College is conducted by the university in the centre of the city, and is designed chiefly for the benefit of teachers. It confers the degrees of A.B., Ph.B. and S.B., on the fulfilment of the requirements for the degrees in the other colleges. The Divinity School includes: (1) the Graduate Divinity School, for college graduates; (2) the English Theological Seminary; (3) the Dano-Norwegian Theological Seminary; (4) the Swedish Theological Seminary. The Graduate Divinity School offers courses leading to the degrees of B.D., A.M. and Ph.D.; certain studies are prescribed for all courses; the others are elective, depending upon the degree to be obtained. The English Theological Seminary offers resident courses in the summer quarter, and non-resident courses during the other quarters; the course covers four years' work. The Graduate School of Arts and Literature and the Ogden School of Science confer the degrees of A.M., M.S., Ph.M. and Ph.D. The Law School was organized in 1902; it requires for admission the equivalent of three years of college work, and confers the bachelor's degree (A.B., Ph.B. or S.B.) after one year's work in the Law School, the degree of Doctor of Laws (J.D.) is conferred on the completion of the full course (three years); special students who maintain a high standing are granted the degree of LL.B. The Medical School offers the courses of the first two years of the medical curriculum only; Rush Medical College (q.v.) is affiliated with the university and provides a full medical course. In 1917, however, a basis for a great new medical school was laid through the provision of a fund of $5,461,500. The Rush Medical School will be an integral part of the new medical school and will be used for graduate instruction. The Presbyterian Hospital, the McCormick Memorial Institute and the Sprague Institute are also parts of the new plan. Within the university quadrangles will be built the A. M. Billing's Memorial Hospital, the Max Epstein Dispensary and a completely equipped medical college conferring the degree of Doctor of Medicine. The School of Education offers courses for the training of teachers which lead to the degrees of A.B., Ph.B., S.B. The University Extension Division offers corresponding courses, which entitle the student completing them to university credit; for fuller description of these courses see the article on UNIVERSITY EXTENSION. The University Library comprises the general library, departmental libraries, the branch libraries and the traveling libraries of the University Extension Division. The Yerkes Observatory, founded in 1892, is located on Lake Geneva, Wis., near the town of Williams Bay; it offers special facilities for advanced work in astronomy. The university press publishes books, pamphlets and departmental journals. The journals are *The Journal of Political Economy, The American Journal of Sociology, American Journal of Semitic Languages and Literatures, Biblical World, The Astrophysical Journal, Journal of Geology, School Review, Botanical Gazette, American Journal of Theology, The Elementary School Teacher, Modern Philology, The University Record, Weekly Calendar* and *Classical Philology.*

Women are admitted to all departments of the university, but those who enter the Divinity School are not expected or encouraged to take up the work of public preaching. The students maintain a Men's Club, Greek letter fraternities, a Dramatic Club, a Glee Club, an Athletic Association, and numerous smaller societies and clubs. Some of the students, nearly one-third, live in the university dormitories on the campus; a few live in their fraternity houses; but the greater part live in the city and its suburbs. All students are required to wear the academic cap and gown on formal occasions. The university campus lies between Washington and Jackson Parks, facing the Midway Plaisance on the south. The buildings, of which there are 40, are built of Indiana limestone, all in the same general style of architecture, an English Gothic; they are grouped in accordance with a fixed plan, which is not yet worked out to completion, but allows for numerous additions. The library contains 545,000 volumes, bound and catalogued, 100,000 volumes uncatalogued and about 250,000 pamphlets. The students (on the basis of nine months' attendance) number about 10,000 and the faculty 400. The general assets of the university amount to about $41,400,000 about half of which represents buildings, grounds and equipment, the remainder representing investments. The current expenses now reach about $2,100,000 annually.

Though the University of Chicago is the youngest of the large universities of the United States, it has taken a leading position. Its

standards of scholarship are the highest, and it carries out the true university ideal, offering the best of opportunities for graduate and research work, and emphasizing that part of its work. Its policy is in many ways unique, notably in the establishment of the summer term. Two other characteristics of the university are the quarter system, which permits a student to take his work when it is most convenient for him and saves him from losing a year because of some enforced absence for a few weeks, and the maintenance of a large enough force of instructors to keep the classes small, thus ensuring students individual attention. Through these affiliations it has exerted a wide influence on the educational institutions of the Middle West, particularly; and through its University Extension Department it has come into close touch with the general public and the work of "popular education."

CHICAGO AND ALTON RAILROAD, a system operated in Illinois and Missouri by a company of the same name, a consolidation of the Chicago and Alton Railroad Company (old) and the Chicago and Alton Railway Company, effective 14 March 1906. The company purchased the property of the Saint Louis, Peoria and Northern Railway Company and also acquired over 98 per cent of the capital stock of the Chicago and Alton Railroad Company, whence its title. The Chicago and Alton Railroad Company, operating under a charter of the State of Illinois, dated 18 Feb. 1861, was originally the Alton and Sangamon Railroad Company, afterward known as the Chicago and Mississippi Railroad Company. The new company on 3 April 1900 leased for a term of 99 years the Chicago and Alton Railroad with its leased lines and agreed to pay as rental the interest on the bonds of the Chicago and Alton Railroad Company, the rentals payable by the Chicago and Alton Railroad Company under the leases of the Joliet and Chicago Railroad, Kansas City, Saint Louis and Chicago Railroad, and Louisiana and Missouri River Railroad, taxes and the surplus net earnings of the leased properties. It owns one-third of the stock of the Joliet Union Depot Company and one-twelfth that of the Kansas City Terminal Railway Company. On 16 Dec. 1902 the company was admitted as a member of the Terminal Railroad Association of Saint Louis, and became the owner of one-fourteenth of the capital stock of the terminal company. For the fiscal year ending 30 June 1915, the company operated 1,052.49 miles of track; of this it owned 687.68 miles and operated 327.79 miles of leased lines, and in addition operated jointly with the Cleveland, Cincinnati, Chicago and Saint Louis Railway Company the line between Wann and East Saint Louis, 17.85 miles. The system also comprised 253.08 miles of second track, 1.72 of third track and 1.63 miles of fourth track, 449.07 miles of sidings, giving a total length of all tracks, 1,757.99 miles. The operating divisions of the system exclusive of trackage rights are: Sherman, Ill., to Grove, Ill., 50.66 miles; Chicago, Ill., to East Saint Louis, Ill., 279.95 miles; Coal City Line, Joliet, Ill., to Mazonia, Ill., 26.92 miles; Dwight, Ill., to Washington and Lacon, Ill., 80.77 miles; Roodhouse, Ill., to Kansas City, Mo., 251.17 miles; Bloomington, Ill., to Godfrey, Ill., 150.83 Mexico, Mo., to Cedar City, Mo., 50.10 miles. miles; Godfrey, Ill., to Wann, Ill., 7.36 miles; The number of passengers carried in 1915 was 3,677,113, an increase of 5.94 per cent over 1914; 7,864,283 tons of revenue freight were carried, a decrease of 7.31 per cent; but, on account of an increase in the average rate obtained, there was a gain of 3.47 per cent, the total freight revenue amounting to $9,200,546.54. The total earnings for year to 30 June 1915 were $14,245,623.76; operating expenses, $11,072,706.81, yielding net earnings, $2,660,583.78. Other income of $97,236.96 gave a total of $2,757,820.75.

CHICAGO, BURLINGTON AND QUINCY RAILROAD, popularly known as the "Burlington Route," a system operating in Illinois, Wisconsin, Minnesota, Iowa, Missouri, Nebraska, Kansas, Colorado, Wyoming, South Dakota and Montana. The nucleus of the system originated in the Aurora Branch Railroad Company, chartered 12 Feb. 1849, a name changed to Chicago and Aurora Railroad Company, 22 June 1852, and to the present corporate title 14 Feb. 1855. The earliest constructed portions of the system were the section of the main line from Chicago to Mendota and the branch from Aurora to West Chicago. By construction, consolidation and purchase, the system has enlarged to its present size. The system was leased 1 Oct. 1901 to the Chicago, Burlington and Quincy Railway Company for 99 years and operated by the railway company until 1 July 1907, when the lease was canceled and the railroad resumed control and operation.

Mileage.— The length of road operated and controlled 30 June 1915 was 9,365.94 miles; of this mileage 9,008.41 miles were owned absolutely by the company. The mileage is located as follows: 1,671.58 miles in Illinois; 222.49 miles in Wisconsin; 23.61 miles in Minnesota; 1,365.12 miles in Iowa; 1,122,30 miles in Missouri; 2,850.34 miles in Nebraska; 259.32 miles in Kansas; 394.36 miles in Colorado; 134.38 miles in Montana; 279.95 miles in South Dakota; and 684.96 miles in Wyoming. The roads east of the Missouri River total 4,387.94 miles, the roads west of the Missouri River 4,620.47 miles. The principal sections are: Main line, Chicago, Ill., to Denver, Colo., 1,077.01 miles; Aurora, Ill., to Minneapolis, Minn., 385.35 miles; Galesburg, Ill., and Saint Louis, Mo., to Kansas City and Saint Joseph, Mo., 486.14 miles; Lincoln, Neb., to Billings, Mont., 836.03 miles and other divisions and branches 6,223.88 miles, all operated as the Chicago, Burlington and Quincy Railroad. The Company also controls, through ownership of securities, the Quincy, Omaha and Kansas City Railroad 261.62 miles and the Colorado and Southern Railway 1,968.05 miles, and has a total of 357.53 miles of leased trackage rights.

Equipment.—The equipment of the company, 30 June 1915 comprised 1,773 locomotives, 1,285 passenger cars, 65,843 freight cars, 5,649 miscellaneous cars and 41 units of floating equipment; total of cars, locomotives, etc., 74,591. For year ended 30 June 1915: total operating revenue, $91,125,060.67; operating expenses, $60,441,367.04; net operating revenue, $30,683,693.63; deductions from net operating revenues, $4,105,665.23; operating income, $26,578,028.40; other income, $1,224,069.41; gross corporate income, $27,802,097.81; deductions from gross corporate income, $22,720,982.46; surplus for the

year, $5,081,115.35; 22,708,392 passengers and 31,758,791 tons of freight carried; the capital stock of the Company was $110,839,100; the funded debt $181,690,000.

CHICAGO GREAT WESTERN RAILROAD COMPANY, popularly known as the "Corn Belt Route," a system operating in Illinois, Iowa, Minnesota, Missouri, Kansas and Nebraska. The company was organized 11 Aug. 1909, under the laws of the State of Illinois, for the purpose of purchasing the properties formerly owned by the Chicago Great Western Railway Company, and sold under judicial decree.

Mileage.—For the fiscal year ending 30 June 1915, the company operated 1,427.10 miles of railway, of which 1,410.13 (less 68.96 miles in Minnesota, between Mankato and Randolph, leased to the M. St. P. R. & D. E. T. Co.) are owned and 85.93 are operated under trackage rights. The line extends from Chicago, Ill., via Oelwein, Iowa, to Minneapolis, Minn., 471.27 miles; from Oelwein to Kansas City, Mo., 364.01 miles; from Oelwein to Omaha, Neb., 283.64 miles; Hayfield, Minn., to Clarion Iowa, 99.71 miles; Randolph, Minn., to Winona, Minn., and Osage Iowa, 208.47 miles; total, 1,427.10 miles. The Company also owns all the stock of the Wisconsin, Minnesota and Pacific and Mason City and Fort Dodge railroad companies, operating in 1915, 208.47 miles and 383.35 miles, respectively, which are included above. The earnings and expenses of each line are kept separate.

Equipment.—The rolling stock consisted of 292 locomotives, with a total traction power of 9,769,000 pounds; 11,110 freight cars; 179 passenger cars and 472 miscellaneous cars. The total operating revenues for year ending 30 June 1915 were $13,920,684; the operating expenses, $10,450,727; taxes, $580,026, leaving a total net revenue of $2,889,931. Compared with the year 1914 both the gross revenues and operating expenses for the year 1915 decreased, the latter in a lesser ratio, so that the net revenues showed a decrease of $37,409.

Business and Funded Debt.—In 1915 there were 2,825,496 passengers and 157,642,318 passengers carried one mile compared with 2,398,685 and 138,735,465, respectively, in 1910, the year of reorganization. The average rate per passenger per mile was 1.950 cents in 1915 as against 1.905 cents in 1910. The comparative revenue tonnage was 5,642,764 and 4,623,102, and tons hauled one mile 1,378,504,602 and 1,189,185,332. The rate per ton mile was 7 mills in 1915 and 7.18 mills in 1910. The permanent capital of the company authorized at $96,000,000 is represented by two classes of stock divided into shares of $100 each; of this amount $89,076,915 were outstanding 30 June 1915, leaving $6,923,085 still issuable. The statement of the funded debt of proprietary lines on 30 June 1915 was as follows: Mason City and Fort Dodge Railroad Company; issued and outstanding, $12,000,000; funded debt per mile, $31,980.39. The funded debt of the Chicago Great Western Company, 30 June 1915, was: issued and outstanding, $25,881,000; funded debt per mile, $25,008.21. The mortgages are secured by valuable leaseholds of long tenure. The proprietary lines, being new, have not yet developed their full earning capacity.

CHICAGO HEIGHTS, Ill., city in Cook County, 28 miles south of Chicago, on the Michigan Central and other railroads. The city manufactures iron and steel goods, carriages, chemicals, glass, lumber, cars, linseed oil, pianos, brick and fireproofing materials. It has a hospital and a Carnegie library. Chicago Heights was settled in 1835 and received its city charter in 1900. The waterworks are municipally owned. Pop. 14,525.

CHICAGO, INDIANAPOLIS AND LOUISVILLE RAILWAY. The company which built the first portion of the Chicago, Indianapolis & Louisville Railway was the New Albany & Salem Railroad Company, chartered 8 July 1847, to build a railway between the points named in its title, a distance of 35 miles. Work was begun in 1849 and the road was completed and opened to traffic in January 1850. Amendments to its charter empowered the Company to extend the road to any place within the State, and work was begun on an extension to Michigan City in 1850, and was completed and opened to the public in 1854. The section from Crawfordsville to Lafayette was built by the Crawfordsville & Wabash Railroad Company, completed in 1852, and was purchased by the New Albany & Salem Railroad Company. The company did not prosper and in 1857 it defaulted interest on its bonds, and in 1858 was turned over to D. D. Williamson, of New York, as trustee, and operated by him until October 1868, when a suit for foreclosure was brought and the road went into the hands of a receiver, passing the next year, under foreclosure sale, to the first and second mortgage bondholders, who organized a new company under the name of the Louisville, New Albany & Chicago Railway Company. Various law suits kept the road in the courts for several years from this date, but in May 1881 a consolidation was effected with the Chicago & Indianapolis Air Line Railway.

In January 1882 the northern extension of the line was completed to a point near Hammond, where a junction was made with the Chicago & Atlantic Railroad, thus giving a line into Chicago. Work was completed on the southern extension to a point four miles north of Indianapolis in October 1882 and, using the tracks of the Lake Erie & Western for these four miles, in May 1883 trains were run through from Chicago to Indianapolis. Subsequently the unfinished portions of the road were completed and the company used its own tracks for the entire distance. In 1889 the company took a 30 years' lease from the Louisville Southern Railroad for its line from Louisville to Burgin, Ky., and another for its Lexington extension. In March 1890, during disputes growing out of the action of newly-elected directors of the lessee road, the Louisville Southern Company took possession of both of the leased branches of its road by force, and a very stormy period of litigation followed.

On 1 March 1886 the Company bought the Orleans, West Baden & French Lick Springs Railway and completed the construction of its lines within one year. On 1 April 1886, the Company bought all of the stock of the Bedford & Bloomfield Railroad Company, amounting to $600,000. Both of these lines are now merged in the present company.

In June 1879 the Chicago & Western Indiana Railroad Company was organized for the purpose of affording a Chicago terminal to several different companies desirous of entering the city, and the Louisville, New Albany & Chicago became a fifth owner in the concern. In November 1882 the Belt Railway Company of Chicago was formed for the purpose of connecting the various railroad terminals, warehouses and other facilities in the city. The five companies that formed the Chicago & Western Indiana Railway Company became the stockholders in this new corporation.

In August 1896 a receiver for the Louisville, New Albany & Chicago Railroad was appointed at the instance of its creditors. In October of that year the consolidated mortgage interest was defaulted, and a reorganization plan was proposed. On 1 July 1897 the purchasing committee under the plan of reorganization delivered the road to a company organized under the name of the Chicago, Indianapolis & Louisville Railway Company. On 15 March 1899 the capital account showed a stock issue of $5,000,000 preferred and $10,500,000 common stock, and a bonded debt of $13,177,000.

In September 1899 the company began the operation of the Indian Stone Railway, extending from Clear Creek to Harrodsburg, a distance of 10 miles, which was constructed under contract with the company in 1898–99.

In May 1902 control of the Chicago, Indianapolis & Louisville Railroad passed to the Louisville & Nashville Railroad Company and the Southern Railway Company, these two companies having acquired 51 per cent of the capital shares of the first named company. In September 1902 a contract was entered into with the Illinois Central Railroad Company for the joint use of 10 miles of their road west from Switz City, for a period of 25 years, thus giving the Chicago, Indianapolis & Louisville Railway an entrance into valuable coal fields. A similar contract was made in May 1903 with the Pennsylvania Company for the joint use of that part of its track between Switz City and Gosport Junction.

Equipment and Earnings.— On 30 June 1915 the company owned 508.79 miles of main track, 275.62 miles of siding and used under contract 113.62 miles of track, making a total of line operated 622.41 miles. The equipment comprises 147 engines, 6,743 freight cars, 120 passenger cars and 155 company service cars. For the fiscal year ended 30 June 1915 the total earnings were $6,559,664.95 and the operating expenses were $4,678,021.14, leaving a net revenue from railway operations of $1,881,643.81. The gross income was $1,794,814.45; the total deductions from gross income were $1,555,040.99, leaving a net income of $239,773.46.

CHICAGO JUNCTION, Ohio, village in Huron County, on the Baltimore and Ohio Railroad, 60 miles southwest of Cleveland. It has fine sulphur springs, owns the waterworks and lighting plant. The repair shops of the Baltimore and Ohio are the principal source of employment. Pop. 2,950.

CHICAGO, MILWAUKEE AND SAINT PAUL RAILWAY, a system operated by the company of the same name in Illinois, Wisconsin, Michigan, Minnesota, Iowa, Missouri, South Dakota, North Dakota, Montana, Idaho and Washington.

History.— The organization was chartered as the Milwaukee and Saint Paul Railway Company, 5 May 1863, the projectors being the purchasers of the foreclosure of the Western Division of the La Crosse and Milwaukee Railroad. The Milwaukee and Western, the Milwaukee and Horicon, The Ripon and Wolf River railroads, and the Eastern Division of the La Crosse and Milwaukee Railroad were subsequently acquired by purchase, and under authority of an act of the legislature of the State of Wisconsin, the present name was adopted 14 Feb. 1874, when the total length of completed roads owned equalled 1,399 miles.

Equipment, Earnings and Funded Debt. — During the fiscal year ending 30 June 1915 the company operated 10,075.61 miles of main track, of which 1,823.59 miles were located in Wisconsin; 475.95 miles in Illinois; 1,936.54 miles in Iowa; 1,250.73 miles in Minnesota; 379.93 miles in North Dakota; 1,794.89 miles in South Dakota; 147.68 miles in Missouri; 245.41 miles in Michigan; 6.30 miles in Nebraska; .77 mile in Kansas; 1,057.21 miles in Montana; 199.41 miles in Idaho and 757.20 miles in Washington. The main track owned solely by the company amounted to 9,617.22 miles which with 1,023.50 miles of second track, 21.72 miles of third track, 13.11 miles of fourth track, 46.98 miles of connection tracks and 3,104.48 miles of yard tracks, sidings and spur tracks, gives a total of 13,827.01 miles owned solely by the Company.

Jointly with other companies it owned 103.45 miles of main track, 6.14 miles of second track, 1.94 miles of third track, 1.93 miles of fourth track, 5.92 miles of connection tracks, 175.34 miles of yard tracks, sidings and spur tracks; total 294.72 miles, and also leased 354.94 miles of main track, 76.47 miles of second track, 1.14 miles of third track, total 432.55 miles, giving a trackage for the entire system of 14,554.28 miles. Extensions from the end of track southeast of Gleason, Wis., 1.55 miles, and from Ladd to Cherry, Ill., 3.41 miles were completed at a cost of $40,495.51, and an extension of the Armour line, 21 miles in a northwesterly direction, and a line 75 miles long extending west from Chamberlain on the Missouri River were under construction. The main line of the system from Chicago, Ill., to Minneapolis, Minn., is 417.40 miles in length. The divisions of the system are as follows: Chicago; Evanston; Racine and Southwest Division in Wisconsin and Illinois; Chicago and Council Bluffs Division in Illinois; Chicago and Council Bluffs Division in Iowa; Kansas City Division; Dubuque Division; Northern Division; River Division; Wabash Division; Chippewa Valley Division; Iowa and Minnesota Division; Prairie du Chien Division; Mineral Point Division; La Crosse Division; Wisconsin Valley Railroad; Iowa and Dakota Division; Sioux City and Dakota Division; Southern Minnesota Division; Hastings and Dakota Division; Des Moines Division; Rochelle and Southern Division; Superior Division; Black Hills Division; Trans-Missouri Division; Rocky Mountain Division; Northern Montana Division; Musselshell Division; Missoula Division; Idaho Division; Columbia Division; and Coast Division. The total equipment 30 June 1915 com-

prised 1,983 locomotives and 68,776 cars of all kinds.

The number of passengers carried during the year amounted to 16,065,456; 858,452,321 passengers were carried one mile at an average rate per passenger per mile of 2.091 cents. The number of tons of revenue freight carried were 32,959,392; 8,185,988,375 tons of revenue freight were carried one mile at an average rate per ton per mile of .7813 cent. The earnings from passenger traffic during the year were 19.63 per cent of the total earnings, a decrease of $1,008,796, or 5.32 per cent, compared with the previous year. There was a decrease of 47,885 tons, or .14 per cent, compared with the preceding year in the amount of freight carried, the earnings from freight traffic were $63,953,798.62, being 69.95 per cent of total earnings, a decrease compared with the preceeding year of $1,361,956.17, or 2.09 per cent. The number of tons of all agricultural products carried during the year was 7,742,673 tons — an increase compared with the previous year of 8.10 per cent. Agricultural products comprised 23.49 per cent of the total tonnage carried, as compared with 21.70 per cent of the total tonnage of 1914. The number of tons of commodities other than agricultural products carried during the year was 25,216,719 tons — a decrease compared with the previous year of 628,308 tons, or 2.43 per cent — the per cent of the total being 76.51 per cent against 78.30 per cent in 1914. The gross earnings for the year ending 30 June 1915 were $91,435,374, the operating expenses $61,971,700, yielding net earnings of $29,463,673; income from other sources $3,649,713 gave a total net income of $33,113,386. The total payments were $21,145,104, leaving a surplus of $11,968,282. During 1915 two dividends, aggregating 7 per cent, were paid on the preferred stock, and two dividends, aggregating 5 per cent, were paid on the common stock. The total amount of the capital stock of the Company at the end of the fiscal year 1915 was $233,636,300, during the year 1915 it was increased by $506,000 of common stock issued and sold. The sum of $434,400 is held in the treasury. The amount of capital stock per main line mile of road owned was $24,163.91 The funded debt at the close of the fiscal year was $482,133,154 — a decrease in the year of $4,748,000; the sum of $123,893,800 is held in the treasury. The amount of the funded debt per main line mile of road owned was $49,864.79. The total capitalization of the company per mile of road was $24,164.

CHICAGO AND NORTH WESTERN RAILWAY, popularly known as "The North Western Line," a system operated by a company of the same name in Michigan, Illinois, Iowa, Wisconsin, Nebraska, Minnesota, North Dakota, South Dakota and Wyoming.

History.— The Company was organized 6 June 1859 to take over the property of the Chicago, Saint Paul and Fond du Lac Railroad Company, sold under a foreclosure of 2 June 1859. The Chicago, Saint Paul and Fond du Lac Railroad Company had been organized 31 March 1855, to consolidate the Rock River Valley Union Railroad Company with the Illinois and Wisconsin Railroad Company, the latter chartered 12 Feb. 1857 to build a railroad north to the Illinois State line, and to consolidate with any railroad in Wisconsin. The Rock River Valley Union Railroad Company, so named 9 Feb. 1850, was previously the Madison and Beloit Railroad, chartered by the legislature of Wisconsin 19 Aug. 1848; it was leased in 1854 by the Galena and Chicago Union Railroad Company which had been incorporated by the State of Illinois, 16 Jan. 1836, to construct a railroad from Chicago to Galena, and lateral lines as they might deem advisable to unite with those of any other railroad company. The Galena and Chicago Union Railroad Company began to build their road in 1847, and their Chicago to Freeport section is the earliest built portion of what now constitutes the great Chicago and North Western System. The Chicago, Saint Paul and Fond du Lac Railroad Company, involved in the great financial panic of 1857, became bankrupt in 1859, and its reorganization as the Chicago and Northwestern Railway Company was authorized by the legislatures of Illinois and Wisconsin.

Operation, Equipment, etc.—By extensions and by the acquisition of other railroads, chief of these undertakings being the grand consolidation with the Galena and Chicago Union Railroad Company (1864), the Madison Extension (1871), the Menomonee Extension (1882), the Elroy Route (1875), the Fort Pierre Extension (1882), the acquisition of the Iowa lines (1884), the Fremont, Elkhorn and Missouri Valley Railroad Company (1903), of the Manitowoc, Green Bay and Northwestern Railway (1909), the Milwaukee, Sparta and Northwestern Railway (1912), and the Saint Louis, Peoria and Northwestern Railway (1913), the Chicago and North Western Railway Company was operating, 30 June 1915, 8,107.82 miles of railroad. Of this it owned 7,946.12 miles, leased 82.93 miles and had 76.78 miles of trackage rights on branches of the Union Pacific Railroad, the Chicago, Saint Paul, Minneapolis and Omaha and other railroads. Of the total mileage 2,170.03 are located in Wisconsin, 1,633.14 in Iowa, 1,102.05 in Nebraska, 1,063.15 in South Dakota, 824.53 in Illinois, 519.88 in Michigan, 650.30 in Minnesota, 130.46 in Wyoming and 14.28 in North Dakota. In addition to the above the company had in operation 1,106.32 miles of second, third and fourth main tracks, and 3,406.53 miles of sidings and yard tracks, making a total mileage of all tracks both owned and operated of 12,620.77. The operating divisions of the system are: Wisconsin Division, 348.46 miles; Northern Wisconsin Division, 332.72 miles; Galena Division, 414.81 miles; Southern Illinois Division 202.17 miles; East Iowa Division, 346.66 miles; West Iowa Division, 222.80 miles; Iowa and Minnesota Division, 335.99 miles; Northern Iowa Division, 383.57 miles; Sioux City Division, 456.70 miles; Madison Division, 696.01 miles; Lake Shore Division, 381.35 miles; Ashland Division, 673.73 miles; Peninsula Division, 464.44 miles; Minnesota Division, 499.88 miles; Dakota Division, 841.85 miles; Eastern Division, 897.41 miles; Black Hills Division, 609.27 miles. In addition the Chicago and North Western Railway Company owns a majority of the capital stock of the Chicago, Saint Paul, Minneapolis and Omaha Railway Company, and has contracts and agreements with other railroad companies as follows: With the Chicago, Burlington and Quincy, securing to that company the joint use of the bridge over the Mississippi

River at Clinton, Iowa, at an annual rental of $20,000; with the same company and the Chicago, Rock Island and Pacific, giving them joint use with this company of certain sidings in Council Bluffs, Iowa; with the Chicago, Saint Paul, Minneapolis and Omaha, providing for joint running arrangements between Chicago and Saint Paul, and divisions of earnings upon a pro rata per mile, with the Chicago Great Western Railroad; granting that company the joint use of certain tracks and buildings in Zumbrota, Minn., with the Union Pacific Railroad Company, the Southern Pacific Railroad Company, the Oregon Short Line Railroad Company and the Oregon Railroad and Navigation Company, providing for the establishment of a through route between Chicago and the Pacific Coast, and with the Chicago, Saint Paul, Minneapolis and Omaha Railroad, and Northern Pacific Railroad companies, providing for the establishment of a through route between Chicago and Northwest Pacific Coast points in Oregon and Washington.

The rolling stock on 30 June 1915 comprised 1,840 locomotives, 1,959 passenger cars, 68,242 freight cars, and 3,626 work cars, including 4 rotary snow plows. The total operating revenues for the year were $80,779,675, comprising freight, $51,923,860; passenger, $20,528,443; other transportation, $6,694,249; incidental, $1,633,121. The operating expenses amounted to 69.78 per cent of the operating revenues or $56,371,573, leaving a net revenue from railway operations of $24,408,102. This, less railway tax accruals, 5.59 per cent of operating revenue amounting to $4,516,943, and uncollectable railway revenues, $7,254, left a railway operating income of $19,883,904. A non-operating income from rentals, dividends, funded and unfunded securities, etc., of $2,799,999, made a gross income of $22,683,904. With deductions from gross income, rental payments, interest on funded debt, etc., $10,769,855, and the disposition of net income in sinking funds $204,053, and dividends 8 per cent on preferred stock and 7 per cent on common stock — total appropriations, $11,103,668 — the balance income for the year was $810,380. Of the operating expenses for the current fiscal year, $32,920,365 or 58.40 per cent was paid employees for labor. The outstanding funded debt which had been decreased during the year by $4,298,000 was, on 30 June 1915, $210,581,000. The Company's authorized capital stock is $200,000,000, of which the following had been issued to 30 June 1915: Common stock and scrip held by the public, $130,117,028; common stock and scrip owned by the company, $2,338,502; preferred stock and scrip held by the public, $22,395,120; preferred stock and scrip owned by the company, $3,834; total capital stock and scrip, $154,854,485.

CHICAGO, ROCK ISLAND AND PACIFIC RAILWAY COMPANY, an Illinois corporation operating besides the main parent line of the same name the Chicago, Rock Island and Gulf Railway, the Morris Terminal Railway, and under lease, the Choctaw, Oklahoma and Gulf Railway, the Rock Island, Arkansas and Louisiana Railway, the Saint Paul and Kansas City Short Line Railway, the Rock Island, Stuttgart and Southern Railway, the Rock Island and Dardanelle Railway, the Peoria and Bureau Valley Railway, the Keokuk and Des Moines Railway and the White and Black River Valley Railway, a total mileage of 8,330.17. The parent company owns the entire capital stock of all these companies with the exception of the three last on the list.

The parent company, The Chicago, Rock Island and Pacific Railway, was incorporated by act of the Illinois legislature, approved 27 Feb. 1847, under the name of the Rock Island and LaSalle Railroad Company, the intention being, as defined in the charter, to construct a line of railroad "from the termination of the Illinois and Michigan Canal" at LaSalle, Ill., to Rock Island, on the Mississippi River, and the capital stock was fixed at $300,000.

The charter amended by the legislature changing the name of the corporation to the Chicago and Rock Island Railroad Company, authorizing it to continue its projected railroad by way of Ottawa and Joliet to Chicago and to increase its capital stock to $3,000,000, was approved on 7 Feb. 1851.

Construction was begun in April 1852, and the first passenger train was run from Chicago to Joliet, a distance of 40 miles, in October of the same year. The full line authorized by the charter, from Chicago to Rock Island, was completed and placed in operation in 1854.

The lines of the affiliated proprietary companies were built subsequently up to 1906, and were leased or acquired for traffic operation by the Chicago, Rock Island and Pacific Railway Company. In 1915, on the application of the American Steel Foundries, a corporation, receivers were appointed to take charge of and operate all the railroads, lands, properties, assets, rights and franchises of the company. The results of the operations for the fiscal year ending 30 June 1915 were as follows: Total operating revenue (increase, $2,272,047.83, or 3.3 per cent), $70,947,889.88; operating expenses (increase, $1,885,794.78, or 3.7 per cent), $53,521,615.06; net operating revenue (increase, $386,253.05, or 2.3 per cent), $17,426,274.82; taxes and uncollectable railway revenue (increase, $50,110.43, or 1.5 per cent), $3,386,379.84; operating income, $14,039,894.98; miscellaneous income, $1,367,916.26; total income, $15,407,811.24; interest and rentals, $16,142,487.76; balance of income carried to profit and loss — deficit, $1,734,676.52. The authorized capital stock of the company is $75,000,000. The amount of capital stock outstanding 30 June 1915 was $74,877,200; of this amount $517,477.50 was owned by the company and held in its treasuary. The total investment in road and equipment up to 30 June 1915 had been $319,565,234.80. The equipment on the same date comprised 1,674 locomotives of all classes, 1,163 cars in passenger service, 45,674 cars in freight service, 4,469 cars in company's service, and 1 steamer.

CHICAGO SUMMER SCHOOL. See SUMMER SCHOOLS.

CHICHEN-ITZA, chē-chăn'ē-tzā' (at the mouth of the well of the Itza), an ancient city of Yucatan whose ruins are fairly well preserved. According to the traditional history of the Itza they came from the west at an early period in their tribal life, settled at the mouth of an overflowing well, built a great city known as Chichen Itzá, and prospered. It is probable that the Itza derived their name from that of

their great culture god Itzamná, or Zamná. Chichen Itzá retained great prominence among the pre-Columbian cities of Yucatan for a long time during which it became a centre of learning and of a very extended commerce which stretched out its arms into Central America and Southern Mexico. As the holiest shrine of the Itzá it exercised a strong religious influence over the peninsula of Yucatan, Campeche, Chiapas and Guatemala, into all of which districts four great paved roads led from the heart of the capital. The remains of the capital of the Itzá to-day consists of a number of fairly well-preserved buildings to which fanciful names have been given, and the ruins of many others which have been completely destroyed. The "Nunnery" is a two-story building on a terrace 32 feet high. The edifice itself, which is reached by a flight of stone steps 56 feet wide, is richly sculptured on the outside. The "Church" is a one-room building of very imposing appearance. The "Akab-tzib" (the place of writing in the dark) is a building built on the level ground. It is 48 feet wide by 149 feet long; and the roof is reached by an outside stairway 45 feet wide. The "Castle" which is built on a very steep pyramid, about 200 feet square at the base and 75 feet high, is reached by a grand stairway 37 feet wide on the west; and by another 44 feet wide on the north. The latter has solid stone balustrades terminating at the bottom in immense serpents' heads each 10 feet long and with open mouths and protruding tongues. The building is rich in carved wood and stone and the main doorway is 20 feet wide. The "Gymnasium" consists of what is supposed to have been the circus of the city. Two immense parallel stone walls 274 feet long and 120 feet apart enclose the court which is open at both ends. A short distance from each end is a terraced building both supposed to have been temples. The "House of the Tigers," at the end of the gymnasium, has massive sculptured pillars and door posts, and carved zapote lintels, while the walls and ceilings are adorned with very elaborate paintings in bright colors, depicting different scenes. The "Red House" (Chin-chan-chob) contains tablets of stone with carved hieroglyphics like those to be found in Guatemala. The "Caracol" consists of two rectangular terraces one above the other, the first 150 by 223 feet, the second 58 by 80 feet, on the latter of which is a round tower with dome-shaped top. The tower is 22 feet in diameter and 24 feet high and through the centre of it there runs, from top to bottom, an immense column of stone round which passes a circular corridor, and between this and the outside wall a second corridor. These corridors probably contained stairways. Great stairways 45 feet wide of huge, intertwining stone serpents lead up the sides of the terraces to the tower. In one part of the city there is a great number of square stone columns from three to six feet high standing in rows from three to five feet apart around an open space some 400 feet square and also irregularly in other directions around various mounds. Several hundred of them have been counted while others lie buried. Heaps of ruined mounds, fallen walls, sculptured blocks scattered over the plain in the vicinity of the buildings already described show that the completely ruined part of the city is vastly larger than the part that is still standing to command the wonder and admiration of the present generation.

CHICHESTER, England, a municipal borough and episcopal city, near the southwest corner of the county of Sussex, 28 miles west of Brighton. It is well built and has wide streets. Its old wall, still in good preservation and lined with lofty elms, gives it a very picturesque appearance. Its principal edifice is the cathedral, an ancient Gothic structure, founded in 1078, with one of the most graceful spires in England, and containing among many monuments one of the poet Collins, who was born and died here. It has a fine old octagonal market-cross. The site of the city was known as Regnum during the Roman occupation, and was the headquarters of Vespasian. During the great Civil War the city changed hands three times in the course of 13 months (1642–43). It is now the headquarters of the Sussex County counsel. Pop. 12,591.

CHICK-A-DEE (an onomatopœic word, imitating the note of the bird), a local name for the black-cap titmouse. See TITMOUSE.

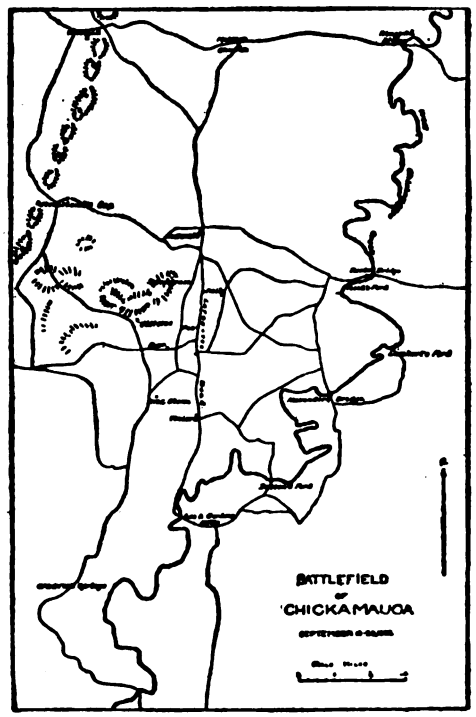
CHICK-PEA, the popular name of *Cicer arietinum* and other plants of the same genus, growing wild along the shores of the Mediterranean and in many parts of the East, and producing a short puffy pod with one or generally two small wrinkled seeds. It is an important article of French and Spanish cookery, and the plant is cultivated in Europe, Egypt, Syria, India, Mexico, etc. When roasted it is the common parched pulse of the East. It is sometimes used as a substitute for, or as an adulterant of, coffee. In Mexico it is an important food, known under the name *garbango*. The herbage serves as fodder for cattle. The chick-peas are leguminous plants of the vetch tribe, differing from the vetches mainly in the fruit. A dozen species are known, having the flowers solitary or in small axillary groups.

CHICKAHOMINY (the river of the coarse-pounded corn, an Algonquin word), a river in Virginia, about 75 miles in length. It is an affluent of the James and runs parallel to it for many miles from its source northwest of Richmond. As its course was between the Union armies and Richmond, on and near it occurred many of the most important events of McClellan's Peninsula campaign in 1862, including the battles of Williamsburg, Hanover Court-House, Fair Oaks, Mechanicsville, Cold Harbor, Savage's Station, Frazier's Farm and Malvern Hill (qq.v.). The second battle of Cold Harbor under Grant occurred 3 June 1864.

CHICKAMAUGA, chĭk-a-mâ'ga, **Battle of**, fought near Chickamauga Creek, and on Georgia soil, 19–20 Sept. 1863. General Rosecrans (q.v.) having forced Bragg (q.v.) out of his fortified position in Middle Tennessee by a campaign of strategy, prepared to gain possession of Chattanooga, the gateway through the mountains to the Gulf States, and a most important railroad centre for the Confederacy. Bragg held the city. Rosecrans' army lay along the western base of the Cumberlands, with headquarters at Winchester, Tenn. His army was composed of three corps of infantry, the Fourteenth, Gen. George H. Thomas; the Twentieth, Gen. Alex. McD. McCook; and the Twenty-first, Gen. Thomas L. Crittenden. Gen.

D. S. Stanley commanded the one corps of cavalry. McCook's corps was the right wing, Thomas' the centre and Crittenden's the left. Stanley's cavalry guarded the right flank and Minty's brigade of cavalry the left.

The plan of campaign involved the repair of the railroad to the Tennessee River, the collection of supplies for a month's absence from any base, and ammunition for two battles and the throwing of Rosecrans' army to the rear of Chattanooga and advancing to it from the south. His centre and right were ascending Lookout before Bragg became aware of the character of the movement. He then evacuated Chattanooga and moved to La Fayette, 26 miles south and behind Pigeon Mountain, the next range east of Lookout, leaving his rear-guard just below Lee and Gordon's Mill at the crossing of the Chickamauga. Crittenden



having accomplished his purpose north of the Tennessee withdrew through Sequatchee Valley to the river, crossed both that and the Sand Mountains and entered Lookout Valley near the north point of Lookout Mountain. A reconnoitering party, 9 September, discovered the evacuation of the city. Passing around the point of the mountain, Crittenden, leaving one brigade in the city, proceeded at once, by way of Rossville Gap, to operate to the left of Thomas, who had descended Lookout at Stevens' Gap. McCook was further to the right, having crossed Lookout at Winston's. The grand strategy of the campaign had been entirely successful. The army had been thrown over three formidable mountain ranges and a wide river, all within the immediate territory of General Bragg, without opposition, almost without discovery and entirely without loss. To possess Chattanooga it remained necessary to concentrate the widely separated corps in it, or between it and Bragg.

Erroneous dispatches led Rosecrans to believe that Bragg was retreating on Rome. He ordered pursuit, and found Bragg occupying the gaps in Pigeon Mountain in force and preparing movements against each separate corps. These failed, and Bragg, having notice of the arrival of Longstreet, with two divisions from the Army of Northern Virginia, issued, 18 September, orders of battle designed for interposing between the Union army and the city. At this time the main bodies of the two armies confronted each other across the upper Chickamauga, and Longstreet was arriving at Ringgold. Crittenden's corps was concentrated at Lee and Gordon's Mill.

During the afternoon of the 18th Gen. Bushrod Johnson from Ringgold, in command of five brigades, including Hood's division of Longstreet's corps, forced a crossing at Reed's Bridge, after a sharp defense by Minty's cavalry. Walker's corps, after failing at Alexander's Bridge, which was defended by Wilder's brigade of mounted infantry, crossed at a ford below. During the night about two-thirds of Bragg's army crossed the Chickamauga, and early in the morning of the 19th, he formed line of battle directly on Crittenden's left flank and in contact with it. Bragg's plan was to drive Crittenden's corps back on Thomas in the centre, and both on McCook at the right, and force the whole into the mountain. His plan of battle was interfered with and finally destroyed by an undiscovered night advance of Rosecrans' centre and right, by which he passed several miles beyond Bragg's position and thrust his lines across the La Fayette road and eastward to the Chickamauga, and so gained position between Bragg and Chattanooga. The head of Thomas' corps, which struck Forrest's cavalry at Jay's Mill, was Brannan's division. The fighting, desperate and at close quarters, continued until 1 o'clock, when Forrest and his supports were repulsed. Soon both armies were rapidly advancing toward this vortex of fierce fighting. It was of desperate character on both sides, continuing from noon until sunset, with alternate success and repulse for each side, the field finally remaining in possession of the Union forces. The fighting throughout the day had been largely in forests thick with underbrush, and so all within the limits of point-blank range. At nightfall Cleburne's division burst with great force upon the lines of Johnson's and Baird's divisions, which were well in advance at the centre. They gradually withdrew from under the fire which continued for an hour after dark. At the close of the fighting for the day Rosecrans' army held La Fayette road between Bragg and Chattanooga, and Bragg's plan of battle for the day had been effectually defeated.

On the Union side the entire force except five brigades had been engaged. Of Bragg's army three divisions and one brigade present had not been engaged, and two brigades did not arrive until the second day. At the close of the first day's battle the Confederate line extended from Hall's Ford to Jay's Mill. The Union line was brought back nearer to La Fayette road, which was the axis and the objective of the battle. The Confederate line ex-

tended far beyond the Union left. Counting by brigades, the Union line was overlapped on its left by four brigades of cavalry, two fighting dismounted, and two brigades of infantry, and on its right by two brigades of infantry. The Confederates had 15 brigades in their reserves, counting Longstreet's second and third lines, Law's and Kershaw's divisions, at the centre. The Union army had five, an overlapping force for the Confederates of four brigades, and an excess of 10 in the reserves. The Union line had strengthened its front by logs, stumps, stones and fence rails. Counting by divisions from left to right, it was formed as follows: Baird, Johnson, Palmer and Reynolds east of the La Fayette road; Brannan, Negley, Davis, Sheridan and Wilder's Mounted Brigade west of it, with Wood and Van Cleve in reserve. The Confederate line, from right to left, was thus composed: Pegram and Armstrong of Forrest's cavalry, Breckenridge, Cleburne, Stewart, Bushrod Johnson, Hindman, Preston, with Walker, Liddell, Cheatham, Law and Kershaw in reserve.

The Confederates attacked about 9 o'clock. Breckinridge moved against Baird; the left brigade, striking Baird's rude works, was broken on them and its commander mortally wounded. The other two brigades swung around full in the Union rear, but were driven back after sharp fighting. Cleburne and Stewart assaulted in succession and were both repulsed. At 11 o'clock Negley, in rear of the Brotherton house, had been replaced by Wood from the reserve, and sent to the left. Brannan, on the left of Wood, had also been ordered to the left, but the Confederate attack developing on his front, he did not move. Upon the supposition that he had gone, Wood was ordered to close on Reynolds, the next division to the left of Brannan. Wood moved promptly to find Reynolds. This left a gap, just as Longstreet, with a column of three divisions, Bushrod Johnson in the front line, Law in the second and Kershaw in the third, was moving to attack Wood's position. This broke the Union centre. Davis' and Sheridan's divisions to the right of the break were rushed toward the gap, but failed to restore the line, and being attacked in front and on both flanks by Johnson's and Hindman's troops were forced off the field in confusion. Rosecrans, Crittenden and McCook, being with the right wing, were driven off the field with that portion of the army which left it. Brannan's division, the first on the left of the break, swung back nearly at right angles, and took position on Snodgrass Hill, a quarter of a mile in the rear, on which also rallied other portions of the Union army that had been scattered or broken. At noon Forrest's cavalry, opposite Cloud's, had crossed La Fayette road and captured the field hospitals of the Union left wing.

The four divisions of Baird, Johnson, Palmer and Reynolds maintained their lines around Kelly field. At 1 o'clock General Thomas had formed parts of Brannan's, Wood's and Negley's divisions, with various fragments, on Snodgrass Hill. Negley had left at noon with two regiments of infantry and 40 guns. General Thomas then found himself with only one battery. About 1:30 the hill was assaulted by five brigades, that of Fulton overlapping Brannan's right and gaining the valley in his rear. At this juncture Gordon Granger arrived from McAfee's Church with Whitaker and Mitchell's brigades of Steedman's division, and promptly attacking, drove the Confederate force, which had crossed the ridge, over it again, and extended General Thomas' line for a half mile along the crest. About the same time Van Derveer's strong brigade arrived from its successful charge on Breckinridge in the Kelly field and strengthened Brannan's line. Longstreet's assault continued with little intermission until sundown. Finally 11 Confederate brigades were participating in the attack on Snodgrass. For its defense Thomas at the last had five brigades and about one-half of two others. There was little fighting on the Kelly field line after 1 o'clock, though Bragg ordered a general attack for 3. It was not delivered until about sundown. At 3 Longstreet, from Snodgrass Hill, asked Bragg for re-enforcements, but was informed that the right wing had been so beaten back that it could be of no service to him. Longstreet's last assault was with troops that had not been engaged. Their attack began at 4:30 and lasted until 6. They gained a salient of the Union line and held it for an hour, with a loss of 36 per cent, but were finally dislodged by Gen. Charles H. Grosvenor's regiment.

At 5:30 General Thomas began withdrawing his army. The four divisions on Kelly field retired in succession from right to left. Reynolds and Palmer were not attacked. The Confederate attack ordered for 3 o'clock was delivered just as Johnson and Baird were leaving their lines, and some captures were made, though both reached the forest west of the La Fayette road without disorganization and followed the rest of the left wing through McFarland's Gap to Rossville. At 7 o'clock the Snodgrass Hill line began to retire from left to right. Steedman's withdrew at 6, sundown. Fighting in his front had ceased. An hour later Trigg and Kelly, passing over the ground which Steedman had occupied, captured the greater part of three Union regiments which were temporarily attached to the left of his line, and by mistake had not received notice of the withdrawal. The last volley of the battle was fired by troops of Van Derveer's brigade at Kelly's and Trigg's lines, which, after capturing the isolated troops, attempted to move on Van Derveer's position. Davis' division, which had been cut off at noon, reached a point on its return near General Thomas' right at sundown. General Sheridan, who had continued to Rossville, marched toward the field from that point, reaching Cloud's an hour after sundown. Both of these divisions acted as supports for the flanks, while the troops were being withdrawn. General Thomas withdrew the army without molestation through McFarland's Gap to Rossville, and during the night placed it in strong position in the gap at Rossville, along the adjacent crests of Missionary Ridge and across the valley to Lookout Mountain. It was thus firmly established between Bragg and Chattanooga. Holding his lines through the next day, at night he withdrew toward Chattanooga.

General Rosecrans crossed the Tennessee with an effective force of a little above 60,000. Two brigades and an additional regiment were detached. A maximum figure for his force at

the opening of the battle would be 55,000. It is difficult to approximate Bragg's force. A week after the battle he reported 38,846 effectives, and his losses to have been 18,000, which would make his force in action 56,846. Gen. R. E. Lee, writing to President Davis of Bragg's strength, five days before the battle, said: "His total effective force will therefore be 76,219, as large a number as I suppose he can operate with." This did not count Longstreet's re-enforcement, according to General Lee's figures, but a large part of Longstreet's forces never reached Bragg. In view of General Lee's statements, and the known overlapping of the Union lines, and the preponderance of his reserves, it would seem that Bragg's force can be fairlv fixed at 70,000.

Few, if any, of the great battles of the war show an equal percentage of casualties, considering the numbers engaged and the time of fighting. The losses in killed, wounded and missing for Rosecrans were 16,179, and for Bragg 18,000. For the troops actually engaged these figures give a percentage of 33 for each side. On the Confederate side, Longstreet's wing lost 44 per cent, nearly all on the second day. Bushrod Johnson's division lost 44 per cent and Preston's 33 per cent in the attack of an hour and a half on Snodgrass Hill; and Gracie's brigade of the latter division lost 36 per cent during the same time. The brigade losses in Cheatham's division ranged from 35 to 50 per cent. The loss in Breckinridge's division was 33 per cent and in Cleburne's 43 per cent. Bates' brigade of Stewart's division lost 52 per cent. The Confederates assaulted throughout the second day.

On the Union side Steedman's division lost 49 per cent in four hours, and all of these but one were killed or wounded. Brannan's division lost slightly over 36 per cent; Van Derveer's brigade of that division only two less than 50 per cent; Davis' division a little over 50 per cent; Van Cleve's division 23.5 per cent. Among the Union brigades Buell's loss was 45 per cent, Carlin's 53 per cent, Hazen's 34 per cent, Dick's 25 per cent, Connell's 37 per cent and Croxton's 39 per cent. Consult 'War of the Rebellion Records,' Vol. 23, parts 1 and 2; Vol. 30, parts 1, 2, 3 and 4. Any good history of the United States.

H. V. BOYNTON.

CHICKAMAUGA NATIONAL MILITARY PARK. Park in Georgia, on the site of the battle of Chickamauga, a few miles southeast of Chattanooga, Tenn., near the Tennessee and Georgia line. Congress, in 1890, passed an act authorizing the establishment of a park on the site of the battle of Chickamauga. In carrying out the project the States of Georgia and Tennessee gave $400,000 and Congress appropriated $725,000. To the United States Federal government the citizens of each State sold and the States ceded jurisdiction over lands and roads included in or leading to the battle-field of Chickamauga, as well as the sites of those actions which took place about Chattanooga, and which the park also commemorates. The actual area of the park is 15 square miles, but to all intents and purposes it embraces a much larger tract. It is the object, so far as possible, to preserve the conditions as they existed at the time of the battle, and in order to make clear the positions and movements of the troops engaged, monuments, historical tablets and other guide marks have been set up at the proper points. Several lofty observation towers have been erected, which command a view of the battle-field. A large part of the park is forest land, but a considerable portion has been cleared of underbrush and small timber, in order to permit free access and unobstructed views. It was dedicated with elaborate ceremonies 19–21 Sept. 1895. It is the first time that a battle-field has been so completely marked and set aside as a monument of the event which happened within its boundary. See BOYNTON, HENRY V.

CHICKAREE, the American red squirrel; a popular name, imitative of its cry. It is a small animal, about seven inches in length of body, with a tail about the same length. See SQUIRREL.

CHICKASAW, chik'ą-sâ, the most active and warlike tribe of the great Muskhogean (q.v.) Indian stock; a branch of the Choctaw (q.v.), and according to their own tradition, not separated till after the united tribe crossed the Mississippi eastward. They occupied northeastern Mississippi, and the adjacent part of western Tennessee to the Ohio. Their chief settlements were on the head-waters of the Tombigbee and Yazoo, about the present Pontotoc and Chickasaw counties, and trail led to them from the site of Memphis, 160 miles off, their principal Mississippi landing. They were first found by De Soto, who reached the village of "Chicaça" with 200 houses, on the west bank of the Yazoo, 17 Dec. 1540, and remained there till March; but when he undertook to impress some of the Indians as porters, he was repeatedly assailed, the village fired, his path barred by a stockade and he lost many men before he beat them off. English traders penetrated thither in the 17th century. After the French settlement at Mobile, the rivalry of the two nations first set them against the French, and for a time cut off the Mississippi trade from both; but with the French, as the only real colonists in that region, they were in constant and envenomed hostility for many years, and Bienville and D'Artaguette led expeditions against them again and again, not even a nominal peace in 1740 putting an end to their warfare. With Oglethorpe of Georgia they had friendly relations. At this time they had four large contiguous settlements, with the houses in each scattered over a space 1 to 2 miles wide and 4 to 10 long; the chief was called Chookka Pharaah, or Long House. Their sachem was called the *mico*. In 1765 Governor Johnstone of West Florida induced them and the Choctaws to hold a council with him at Mobile, where a trade tariff was framed; but the white traders among them soon precipitated fresh troubles. After the Revolution, at the great general treaty of Hopewell, 28 Nov. 1785, their *mico* Pio and others made a treaty delimiting their lands from the Ohio River to the Mississippi State line. Their number was then estimated at 800 to 1,200. The reliability of these estimates may be judged from the fact that they are said to have had 10,000 warriors when they crossed the Mississippi, 450 in 1755, 750 in 1764 and 500 in 1768. In 1793 they joined the whites against the Creeks, and continued friendly to the settlers. In 1805, 1816 and 1818, they gradually

ceded all lands north of the Mississippi line. About 1800, as the hunting grounds narrowed, the tribe began to migrate west of the Mississippi, as did the Cherokees and others. In 1822 there were in Mississippi 3,625 on a reliable count, with eight towns, and a progressive civilization: they were industrious farmers and cattlemen, marketing live stock among the whites. By the treaty of Pontotoc Creek, 20 Oct. 1822, they made another large cession of lands; and by that of Washington, 24 May 1834, they gave up all the remainder, the two cessions comprising 6,442,400 acres, or over 10,000 square miles, for which they received $3,646,000. On 17 Jan. 1837 they bought of the Choctaws for $530,000 a district on the Red River west and south of the Washita (the extreme western part of the subsequent Indian Territory, now incorporated in Oklahoma), to be inalienable except with the consent of the Choctaws; relinquished their governmental organization and became a part of that nation, with proportionate representation in its government. A considerable number, instead of remaining with the tribe, scattered through the Choctaws, buying and taking up lands at pleasure. They lagged behind the Choctaws in progress, however; a smallpox epidemic carried off several hundred; the government annuity made them lazy; and they opened no schools till 1851. Aggrieved at being represented in the Choctaw government only according to numbers, instead of equally as a tribe, they appealed to the President, and on 27 June 1855 were given separate title to their district as the Chickasaw Nation. They organized a government with a council and two-chambered legislature, and advanced rapidly. In the Civil War, as slaveholders, and having Southern agents, they joined the Confederate side; lost about one-fourth of their people, and were liable to the penalties of treason. By the treaty of Fort Smith, September 1865, they were conditionally restored to their rights. On 28 April 1866 all the old treaties were renewed; but they were forced to sell to the government 7,000,000 acres of land, nearly 11,000 square miles, for $315,000, the money to go to their former slaves unless they admitted them to full tribal citizenship. They held off for some years, but finally acceded on 10 Jan. 1873. The "nation" in 1915 numbered 10,966, of whom 5,659 were blood Indians, 645 of intermarriage descent and 4,662 freedmen. Under treaties with the United States government, the lands in the Choctaw and Chickasaw nations were held in common by members of both tribes, the Choctaw lands comprising 6,953,848 acres and the Chickasaw lands 4,707,903 acres. Owing to their allied interests citizens of both nations had the right to select their allotments of land in either or both nations at their options. In view of this common interest, matters pertaining to these two nations are treated under one head. There have been allotted to citizens and freedmen of these two nations a total of 8,091,386 acres, leaving 3,569,565 acres, of which 98,474 acres have been reserved for various purposes, not including 431,080 acres segregated for coal and asphalt, but including reservations made therefrom for coal leases. Tracts comprising 2,431,361 acres were sold for $14,053,760. Over one-half of the sales price, together with interest thereon, was collected and deposited in the United States Treasury to the credit of these nations. See also CHOCTAW; INDIAN AFFAIRS.

CHICKASAW BAYOU or BLUFFS, Battle of, fought 29 Dec. 1862. On 8 Dec. 1862 General Grant ordered Gen. W. T. Sherman to organize at Memphis, Tenn., an expedition which in co-operation with Adm. D. D. Porter's gunboat fleet should reduce Vicksburg. On the 22d the expedition rendezvoused at Friar's Point on the Mississippi, ready to move up the Yazoo River in rear of Vicksburg. Sherman had the four divisions of Gens. F. Steele, Geo. W. Morgan, M. L. Smith and A. J. Smith, aggregating about 30,000 men. The transports, preceded by the gunboats, entered Yazoo River on the 25th, and on the 26th and 27th the troops were landed on its south bank, confronting the bluffs overlooking the swamps through which ran Chickasaw Bayou. Gen. J. C. Pemberton, commanding the Confederate forces in Mississippi, was at Grenada opposing Grant, who was moving south from Grand Junction and Corinth on the line of the railroads. On the 21st Pemberton heard that the fleet and transports were moving down the Mississippi for the supposed purpose of attacking Vicksburg, which at the time was held by Gen. Martin L. Smith with the brigade of Gen. S. D. Lee. Vaughn's brigade was immediately ordered to Vicksburg, and was soon followed by the brigades of Gregg and Barton. Pemberton arrived at Vicksburg on the 26th and the last of the three brigades during the night of the 27th. Pemberton disposed his forces, under Vaughn, Gregg, Barton and Lee, on a line from Vicksburg on the left to Haynes' Bluff on the right, a distance of 13 miles, on high ground overlooking Chickasaw Bayou and the Yazoo River, S. D. Lee holding Walnut Hills from Vicksburg to Snyder's Mill on the right, a distance of 10 miles. Lee, a good engineer and a fine officer, strengthened his position by works for his batteries and rifle pits on the slope of the bluff, which rose about 200 feet above the Bayou. Between this position and where Sherman had landed was bottom land, almost wholly densely wooded, intersected with bayous and low, swampy ground. There were but three roads through this area, and these were obstructed by earthworks and felled timber. By these Sherman advanced on the morning of the 27th, Steele on the left, Morgan on the right of Steele and M. L. Smith and A. J. Smith on the right of Morgan. There was heavy skirmishing on the 27th and 28th, the Confederate outposts were driven in, and on the night of the 28th the Union troops lay parallel to Chickasaw or Walnut Hills bluff and about 600 yards from its foot. The main assault on the bluff was to be made by Morgan, supported by Steele; while, to make a diversion in favor of Morgan, A. J. Smith, with M. L. Smith's division and one brigade of his own, was to cross a lake, a mile below Morgan, by a narrow sand-bar, and attack. On the extreme right the rest of A. J. Smith's division was to demonstrate on the road to Vicksburg. On the morning of the 29th Morgan represented to Sherman that an attack from his position was impracticable; but Sherman, after an examination, rode off to his headquarters, whence he sent his adjutant-general to Morgan with this message: "Tell Mor-

gan to give the signal for assault; that we will lose 5,000 men before we take Vicksburg, and may as well lose them here as anywhere else.» Morgan replied that Sherman's entire army could not carry the position in his front, but that he would order the assault. De Courcy's brigade of Morgan's division, and the two brigades of Blair and Thayer of Steele's, were formed for the assault. The signal was given by a heavy artillery fire upon the Confederate lines, and at 12 o'clock the three brigades went forward. By some misunderstanding Thayer's brigade, with the exception of the 4th Iowa, diverged too far to the right, but De Courcy, Blair and Thayer (with the 4th Iowa), about 6,000 men, after clearing the obstruction in front and floundering through deep mire and tangled marsh, under a terrific fire of artillery, finally made a lodgment on the hard tableland at the foot of the bluff, where an abandoned line of works gave shelter, and where some of the men stopped. All formation was broken up, brigades and regiments mixed, but on went the main body, pushed up the bluff, and reached different points of Lee's works, where they were met on both flanks by such a withering fire from the rifle-pits that ran diagonally up the slope of the hill, and so severe a cross-fire of shell and canister from the batteries, that the men faltered and, no support being in sight, fell back to the point of starting, leaving about 1,500 killed, wounded and captured. Lee lost 115. More to the right, where A. J. Smith was to demonstrate, the 6th Missouri gained the levee at the foot of the bluff, but not able to go farther under the hot fire poured upon them from above, the men sought shelter by digging with hands and bayonets into the bank of the levee, where they remained until night covered their withdrawal, after a loss of 57 killed and wounded. Sherman thought of renewing the assault in the morning, but after a personal examination, he came to the conclusion that the enemy's centre could not be broken without crippling his army beyond the power to act with any vigor afterward, and proposed to attack Haynes' Bluff, higher up the Yazoo. Preparations were made to assault at 4 o'clock on the morning of 1 Jan. 1863. Admiral Porter, who was to co-operate in this attack, found the fog so dense on the river that he could not move his boats. The attack was deferred and then abandoned, and by sunrise, 2 January, the troops were all embarked on transports and sailed for Milliken's Bend. The Union loss in the assault on Chickasaw Bluffs and in the skirmishing preceding it was 1,213 killed and wounded, and 563 missing. The Confederate loss was 177 killed and wounded, and 10 missing. Consult 'Official Records' (Vol. XVII); The Century Company's 'Battles and Leaders of the Civil War' (Vol. III); Greene, F. V., 'The Mississippi'; Sherman's 'Memoirs' (New York 1888).

E. A. CARMAN.

CHICKASHA, chik'-a-shā, Okla., city and county-seat of Grady County, on the Rock Island, The Frisco, Oklahoma Central and Santa Fé railroads. The city has an altitude of 1,100 feet above sea-level, has a delightful climate and an abundance of good water. Grady County is ideal for the raising of wheat, corn, cotton, alfalfa, fruits and stock, and the rapid growth of the city is due to the extent and value of the agricultural crops. The commercial business interests of Chickasha are large and growing rapidly. The city has three large cotton gins, two of the largest cottonseed-oil mills in Oklahoma, the plants being among the largest in the world, one of the largest cotton compresses in the South, the only cotton-oil refinery in State, large flour-mills and elevators, 33 wholesale manufacturing and commission houses. The United States census of manufactures for 1914 reported 29 industrial establishments, employing 430 persons, of whom 337 were wage earners, receiving annually $235,000 in wages. The capital invested aggregated $1,315,000, and the year's output was valued at $1,720,000; of this, $443,000 was added by manufacture. The large railroad machine shops located here employ nearly 1,000 persons. Chickasha is the largest stock feeding and cotton concentration point in the State. There are five banks with a combined capital and surplus of $670,000. Chickasha has an admirable school system, many fine churches, a Carnegie library, a Federal building costing $150,000 and is the home of the Oklahoma College for Women. The city owns and operates its own water system. Pop. (1910) 10,320; (1914) 13,873.

CHICKEN. See FOWL.

CHICKEN-FLEA, the common name of *Sarcopsylla gallinacea*, a pest of young chickens in tropical and subtropical regions, and destructive from Florida to Texas. It is smaller and shorter than the cat-flea, with the eyes and antennæ in the higher part of the head, and it does not hop. It abounds mostly in shady places, under old houses, and in earthen floors. It is first observed to infest young chickens and turkeys, and by its number and pertinacity kills young chickens, while being more or less permanently parasites on hens. See JIGGER; SARCOPSYLLA.

CHICKEN-LICE, several species of bird-lice (*Mallophaga*), or louse-like wingless insects, afflicting chickens and hens. Unlike the louse (*Pediculus*), which obtains its nourishment by suction, the bird-lice have free jaws adapted for cutting feathers, though they also draw blood from the skin of their host. The large chicken-louse (*Goniocotes abdominalis*) is less common than the lesser chicken-louse (*G. hologaster*); it is only one millimeter long, while the first-named kind is three millimeters long. Quite a different kind is the common hen-louse (*Menopon pallidum*), which is the most abundant and annoying of all. It differs from the others in its light color and greater activity, running among the feathers and from them upon the hands of persons handling fowls. It is from one to one and a half millimetres long, rather slender and of a pale straw-yellow color. Fowls should be allowed plenty of ashes and road dust in which to roll. An infested hennery should be well fumigated and whitewashed, and insect-powder should be dusted upon the birds themselves.

CHICKEN-MITE, or **POULTRY-TICK**, a small mite (*Dermanyssus gallinæ*) which gathers on fowls at night and sucks their blood. It is about one millimetre high, light gray, with dark patches, but red when gorged with blood.

It swarms in cracks and corners of the hen-house and should not be confounded with the bird-tick (*D. avium*),

CHICKEN-POX, varicella, an acute, specific, infectious disease, characterized by a definite incubation period, an eruption of successive crops of vesicles which persist for a certain length of time and a well-marked clinical course of short duration. It is one of the mildest of the eruptive fevers. The disease is usually epidemic, but sporadic cases do occur. It very frequently accompanies small-pox, and great care must be exercised not to confound mild cases of small-pox with severe cases of chicken-pox. The stage of incubation is usually about eight days, although it may vary from 8 to 18 days. The child may be feverish in some cases, have a slight chill, pain in the back and legs, nausea and vomiting. The eruption usually develops within 24 hours after the first onset. There are first raised red papules which in a few hours are transferred into raised hemispherical vessels filled with clear serum. At the end of 36 to 48 hours, this clear serum may become purulent, and the vesicles then begin to shrivel, and in from three to four days are changed to dark-brown crusts which fall off and rarely leave a scar. Fresh groups occur during the first two or three days of the illness; as a rule they are not very many in number. In delicate children the number may be large, and gangrene may set in unless great care is taken in the treatment of the vesicles. Chicken-pox is very contagious, but is not dangerous, and the first treatment should be the complete isolation of the patient.

CHICKEN-SNAKE, a name given in the Southern States to several different, but allied snakes that occasionally eat birds and small poultry, although their principal fare is rats and mice. Search for these brings them about farm buildings, but they do little harm as compared with their beneficial service. The blotched chicken-snake is a variety (*confinis*) of the pilot blacksnake (*Coluber obsoletus*), and is gray with dark brown blotches, which become H-shaped on its neck. The yellow chicken-snake is another variety (*quadrivittatus*) of the same species, yellow or olive, with four blackish stripes and a strong black line from the eye to the nostril. Both are common throughout the Southern States, where they reach a length of six or seven feet. (See BLACKSNAKE). The red chicken-snake is a local name of the cornsnake (q.v.).

CHICKEN-TICK, an arachnid of the family *Argasidæ*, and related to the mites, but very much larger. Originally an inhabitant of tropical America, this tick (*Argas miniatus*) has been found to annoy poultry in Texas and Florida. It is about a quarter of an inch long, usually very flat, unless gorged with blood. The surface of the body differs from that of other ticks in having scattered pits with a raised edge; it also differs from ordinary ticks in the head being covered by the body, in the spiracles being placed between the third and fourth pairs of legs and in having no pulvillum between the claws. It was originally found in Texas among ordinary ticks taken from cattle. The young is six-footed. Of 10 other species of *Argas*, *A. reflexus* of the Old World lives on pigeons and occasionally attacks man; the Persian *Argas* (*A. persicus*) in Persia attacks man and poultry.

CHICKERING, Jonas, American piano maker: b. New Ipswich, N. H., 5 April 1797; d. Boston, Mass., 8 Dec. 1853. The instruments made by Chickering were works of art. Before his death his Boston factory was turning out 2,000 pianos a year. The firm has been carried on continuously by his sons, and their pianos have a high reputation among musicians everywhere. Some of the most important developments in pianoforte construction have first been introduced in the Chickering piano.

CHICKWEED (*Alsin media*), an annual plant, of the family *Alsinaceæ*, abounding throughout temperate regions of the world in ill cultivated or neglected places. It grows in waste places throughout North America, and may be used when young as a substitute for spinach and other greens.

CHICLANA, chē-klä'nä Spain, town in Andalusia, 12 miles southeast of Cadiz. It stands in a plain on both sides of the Lirio, and about a mile northeast of Barrosa, famous for the defeat of the French, under Marshal Victor, by the British under General Graham, in 1811. It consists of well-built houses of hewn stone, white as snow, and generally enclosed by gardens. The principal buildings are a magnificent hospital, two parish churches and a large and well-decorated theatre. The manufactures consist of linen, starch, earthenware and other articles, and there is a considerable trade in corn, wine and fruit. The baths of Chiclana, which have a temperature of 60°, and are said to be very efficacious in cutaneous affections, are much frequented. Pop. 11,496.

CHICLAYO, chē-klä'yō, Peru, city in the northwest in the department of Lambayeque, on the coast, is near a valuable sugar district, and the shipping of the sugar is its chief occupation. It is the residence of a United States consular agent. Pop. 13,000.

CHICLE-GUM, chēkl- or chē'klą-, an elastic-gum produced by the bully-tree, naseberry or sapodilla (*Achras sapota*), a native of South America. It is largely imported into the United States for the purpose of being manufactured into chewing-gum.

CHICO, chē'kō, city in Butte County, 95 miles north of Sacramento, on Chico Creek, and on the Butte County and the Southern Pacific railroads. It has a natural park of 2,000 acres, a Carnegie library and a State normal school. Its industrial establishments include match factories, flour-mills, machine shops and foundries, electric-car shops, etc. Dairying, fruit-growing, lumbering and mining are also important. Pop. 3,750.

CHICOPEE, Mass., city in Hampden County, on the Connecticut River, at the mouth of the Chicopee, four miles north of Springfield, and on the Boston and Albany and Boston and Maine railroads. It is connected with Holyoke and Springfield by electric street railway lines. The former villages of Chicopee Falls, Williamamsett and Fairview are now included in Chicopee city, which has manufactures of cotton, artillery, bronze, bicycles, rifles, swords, paper, rubber tires, automobiles, etc. The United States census of manufactures

for 1914 recorded 62 industrial establishments of factory grade, employing 9,119 persons, of whom 8,425 were wage earners, receiving annually $5,131,000 in wages. The capital invested aggregated $23,501,000, and the year's production was valued at $28,869,000; of this, $11,751,000 was the value added by manufacture. Manufacturing power is furnished by the Chicopee River. It contains numerous church, public and parish schools, national and savings banks. Pop. 28,000.

CHICOPEE RIVER, rises in Worcester County, Mass., flows south-southwest into Connecticut River. It has an abundance of water power which is utilized for manufacturing by the numerous towns on its banks. It is 20 miles long from the mouth to Three Rivers. It drains an area of 700 square miles. It has a rapid fall and supplies extensive water power.

CHICORY, or SUCCORY, a perennial herb (*Cichorium intybus*) of the family *Cichoriaceæ*. It is a native of Europe which has become naturalized in many parts of the world, having escaped from gardens in which it is often grown as a pot herb and salad, or for its roots, which, while young, are used like carrots. In many places it has become troublesome as a weed. The plant may be cultivated like other root crops upon rich, deep, well-drained soil. It resembles dandelion in its leaves, but the perennial roots send up a branched flower-stem which bears leaves of various shapes and flowers of various colors, blue predominating, but pink and white not being uncommon. The dried roots have been widely used as a substitute for or adulterant of coffee.

CHICOUTIMI, shē-koo-tē'mē, Canada, county of the Quebec province, formed from Saguenay in 1853. Several smaller sheets of water are scattered over its surface, and the Saguenay intersects it, receiving in its course several small tributaries. The surface is rocky, rough and broken, but near the streams are fertile and cultivated strips. A great deal of lumber is cut and sawed on the small streams emptying into the Saguenay. The Hudson Bay Company have several stations in the county. The capital is Chicoutimi, with a population of 5,580. It is the seat of a Roman Catholic bishopric and of a classical college founded in 1873.

CHIEF JUSTICE, the title of the presiding justice of the Supreme Court of the United States, and of the presiding justice of the several State Supreme Courts. Various other courts in the United States are also presided over by a chief justice. The chief justice of the United States is the highest judicial officer of the republic. Among his functions are those of administering the oath of office to the President and Vice-President at their inauguration, and of presiding over the Senate when that body is resolved into a high court for the trial of impeachments. In official dignity he ranks next after the President. In England the superior judges of the King's (or Queen's) bench and of the Court of Common Pleas are called chief justices, the former being known as Lord Chief Justice of England, and ranking all other judicial officers except the Chancellor. (See CHIEF JUSTICE OR LORD CHIEF JUSTICE.) The following is a list of the persons appointed as chief justice of the Supreme Court of the United States from its establishment, some of whom, however, never served:

John Jay, of New York, appointed by Washington, 26 Sept. 1789; resigned 1791.

John Rutledge, of South Carolina, appointed by Washington, 1 July 1795; rejected by the Senate, 15 Dec. 1795.

William Cushing, of Massachusetts, appointed by Washington, 26 Jan. 1796; declined promotion from his associate justiceship.

Oliver Ellsworth, of Connecticut, appointed by Washington, 4 March 1796; resigned 1800.

John Jay, of New York, appointed by John Adams, 19 Dec. 1800; declined.

John Marshall, of Virginia, appointed by John Adams, 31 Jan. 1801; died, 6 July 1835.

Roger Brooke Taney, of Maryland, appointed by Jackson, 15 March 1836; died, 12 Oct. 1864.

Salmon Portland Chase, of Ohio, appointed by Lincoln, 6 Dec. 1864; died, 7 May 1873.

George H. Williams, of Oregon, and Caleb Cushing, of Massachusetts, appointed by Grant 1873; rejected.

Morrison R. Waite, of Ohio, appointed by Grant, 21 Jan. 1874; died, 23 March 1888.

Melville W. Fuller, of Illinois, appointed by Cleveland, 20 July 1888; died, 4 July 1910.

Edward Douglass White, of Louisiana, appointed by Taft, December 1910.

CHIEF JUSTICE, or LORD CHIEF JUSTICE, in England; the presiding judge in the king's or queen's bench division of the High Court of Justice, and, in the absence of the Lord Chancellor, president of the High Court, and also, ex officio, one of the judges of the Court of Appeal. The chief justice of the Court of Common Pleas, previous to 1881, was the presiding judge in the common pleas division of the High Court of Justice, but the office is now merged in that of the chief justice of England. The title chief justice is also generally given in the various British colonies to the heads of the different judicial establishments, as in Canada, Australia, etc. In Canada there is not only a chief justice at the head of the Supreme Court of the Dominion, but also chief justices in the separate provinces.

CHIEF MOUNTAIN OVERTHRUST. See LEWIS OVERTHRUST.

CHIEF OF STAFF. See GENERAL STAFF OF THE ARMY.

CHIEMSEE, kēm'zā, the largest lake in Bavaria, circle (also known as Bayrisches Meer), Isar, district Trostberg, 48 miles southeast of Munich; greatest length, 9 miles; greatest breadth, 6 miles; area, 33 square miles; depth, about 480 feet. It is of an irregular shape, very much indented and contains three pretty islands — Krautinsel, Herrenwörth and Frauenwörth.

CHIERI, kyā'rē, Italy, city in the province of Turin, eight miles east-southeast of the town of Turin. It is walled and well built, contains the largest Gothic church in Piedmont, with a very ancient baptistery, and at a very early period became celebrated for its manufactures of fustian, which are still flourishing. It has a

gymnasium, a technical school, a theatre and linen, cotton and silk factories. In the 11th century it was an independent republic. Pop. 15,454.

CHIETI, kyā'tē, Italy, capital of province of same name, on a hill near the right bank of the Pescara. It was anciently one of the largest and most important towns in this part of Italy, and was for some centuries in possession of the Greeks, from whom it passed successively to the Romans, Lombards, Franks and Normans. In 1802 it was taken by the French troops. The modern town, which is well built and adorned with several handsome edifices, is the see of an archbishop and the seat of a superior civil and criminal court, and has manufactures of woolens, and a trade in silk, wine, wheat and oil. Pop. 26,897.

CHIFF-CHAFF, a small European bird (*Sylvia hippolais* or *Phylloscopus collybita*), of the warbler family (*Sylviidæ*), so named from its cry. Its head, back and upper wings are ashy brown, and its under parts are brownish green dashed with yellow. In length it is between four and five inches, and it frequents woods, hedges and thickets. Its food consists of the larvæ of various insects and some of the smaller moths.

CHIGI, kē'jē, a noble Italian family, founded by AGOSTINO CHIGI (d. 1520) of Siena. He became a patron of the fine arts and banker for the Pope. Peruzzi built for him the well-known Villa Farnese. Raphael painted there the 'Triumph of Galatea' and 'The Legend of Psyche.' Sodoma ornamented it with his fresco 'The History of Alexander and Roxanna.' Consult Cugnino's 'Agostino Chigi il Magnifico.' The family was further distinguished by five cardinals and one Pope, Fabio Chigi (1652), afterward Alexander VII (q.v.). FLAVIO CHIGI: b. 1810; d. 15 Feb. 1885, was one of the papal guard until 1848, when he was made bishop of Mira *in partibus*, nuncio at Munich, but was sent to Paris (1873) and later in the same year was made cardinal.

CHIGNECTO, shĭg-nĕk'tō, **BAY,** Canada, an inlet at the head of the Bay of Fundy, separating Nova Scotia from New Brunswick. It is 30 miles long and 8 broad, and has an isthmus of only 14 miles in width between it and Northumberland Strait, in the Gulf of Saint Lawrence.

In October 1888 work was begun on the construction of a ship railway across the neck of land connecting Nova Scotia with the main land of Canada, under the encouragement of an annual subsidy from the Canadian government. The promoters had spent nearly $4,000,000 on the work, when in 1890 a financial depression in London prevented them from obtaining further capital. In March 1901 the undertaking was revived. The railway, 18 miles long, by uniting the Gulf of Saint Lawrence with the Bay of Fundy and the waters of the Atlantic Ocean, saves a run of several hundred miles around the province. See SHIP-RAILWAY.

CHIGNON, shēn-yôn, (Fr. *chignon*, the nape of the neck), a peculiar arrangement of the hair, worn by women, a knot or mass, natural or artificial, arranged low on the back of the head, at the nape of the neck. This style of hair-dressing was common in the 18th century, but fell into disuse and was revived in the last half of the 19th century, but is not now in vogue.

CHIGO, chē'gō. See JIGGER; SARCOPSYLLA.

CHIHUAHUA, chē-wä'wä, Mexico, state bounded on the north by the United States, on the east of Coahuila, on the south by Durango and on the west by Sinaloa and Sonora. It is the largest of the Mexican states, having an area of 89,998 square miles, or about double that of the State of New York. The Sierra Madre Range traverses the state, and the Sierra de Tarahumares lifts its peaks (Bufa de Cerro Prieto, Jésus y Maria, Mesa de Tabascotes, etc.) to a considerable height; otherwise the surface is an undulating table-land, the elevation of which varies from 3,500 to 7,000 feet above sea-level. The largest of the elevated plains lying between the mountain ranges are the Chilicote, Gigantes, Bolsón de Mapimi, etc. The Rio Grande forms the northern boundary, separating the state from the United States; but this river, which rises in Colorado and flows through New Mexico, is almost dry by the time it reaches Mexico territory, the greater portion of its waters having been utilized for the irrigation of lands in the country of its origin. The climate is temperate and healthful and the soil fertile wherever watered. Agricultural products consist of corn, wheat, several kinds of vegetables and fruit, including grapes. Cotton is also grown successfully in the Torreon district. The forests are found mostly in the mountainous districts of the west. Chihuahua has considerable mineral deposits, its silver mines being among the richest in the republic. Some of them were worked by the Indians at the time of the Spanish Conquest. The state's production of lead is also noteworthy and zinc is also abundant. Over 5,250 mining properties are recorded for its entire area. The state is traversed from north to south by the Mexican Central Railway. A considerable portion of the population is creole or white; the rest consists of Indians partly civilized. There are some Apaches in the mountains. In recent years large numbers of foreigners, chiefly Americans, have secured control of the industries and have already raised the state to a leading place in the republic. A flourishing Mormon agricultural colony was founded in 1886 west of Ciudad Juarez. The state suffered severely in the many revolutions which followed the fall of the Diaz régime, being overrun with bandits, who despoiled the residents, both native and foreign, and practically brought the various industries to a standstill. The state was invaded by United States troops under General Pershing in March 1916, who were dispatched to capture the bandit, Francisco Villa, who had made a murderous raid on Columbus, N. M., a few weeks previously. Pop. (1910) 405,265. The capital is Chihauhua.

CHIHUAHUA, Mexico, capital of the state of the same name, the northern border of which forms the dividing line between Mexico and the United States, and one-third of the width of the first named country. Altitude, 4,973 feet above sea-level. Distance from the United States border at El Paso, Tex., 225 miles and

from Mexico city, 999 miles. It is well provided with transportation facilities, being on the lines of the Mexican Central and Kansas City, Mexico and Orient railways, and the initial terminal of the Chihuahua and Pacific Railway. Is the centre of one of the most important stock raising and mineral producing districts south of the Rio Grande. It is the first point of importance reached in the journey from the northern boundary of the country to the City of Mexico. It is an important supply point for miners whose properties are situated in the mountain regions to the west and southwest. Among the manufacturing establishments of the city are extensive rolling mills and iron works, a brewery, a soap factory, a manufactory of clothing, broom factory, mineral water factory, manufactory of agricultural implements and various smaller industries. Since the outbreak of the revolutionary movements within the past few years, of which it has been the starting point, its industries and social life have come practically to a standstill.

A few miles distant from and connected with the city by railway, are the Santa Eulalia Mineral Springs and health resort, for which great merit is claimed. The principal buildings of a public character are the new penitentiary; the old cathedral, completed over 200 years ago by the contributions of a rich miner, at an outlay of almost $1,000,000, the recently built opera-house, one of the largest and finest in the republic; the Government Palace, the palatial home of ex-Governor Ahumada; the new municipal palace and the Mineral Bank. It was here that the patriot Hidalgo suffered imprisonment and was executed in 1811. The tower or dungeon in which he was confined is sacredly preserved and will ever be reverently visited by tourists. In the plaza adjoining the Government Palace a splendid monument has been erected in his honor. The Alameda, situated in the business centre, is utilized on Sunday evening of every week by all classes as a promenade, the occasion being always enlivened by excellent music provided by the state government. An aqueduct built over 200 years ago conveys water into the city, and a modern built street railway provides means of local transportation. A museum of minerals recently established by the state has already become one of the city's chief places of interest. Advanced methods of primary education are receiving much attention, both from the state and municipal governments, and higher education is provided by a normal school for young women, a college for young men and a number of clerical and other institutions of advanced instruction. A library connected with the Preparatory School contains 6,000 volumes. The principal scientific organization is devoted to the study of medicine and is known as the "Medica Mutualista." Financially, Chihuahua is one of the best equipped cities in the republic. It has four local banks,—the Mineral Bank, with a capitalization of $5,000,000, the Chihuahua Exchange Company, the Chihuahua Investment Company and the Commercial Bank; besides which there are branches of the National Bank and the bank of Sonora, and an agency of the bank of London and Mexico.

CHILAN BALÁM, chē-lăn′, bă-lăm′, **the Books of,** a series of Maya writings dating back to the end of the first century of the Christian era. They were written by a priest or *chilan* by the name of Balam, in the Maya language with Latin characters, which had already replaced the ancient Maya system of writing throughout Yucatan. The books of Chilan Balam seem to have been a collection of Maya stories and records which had been, at the time of the conquest, and probably long previous to it, written in the ancient Maya script. Balam either copied these manuscripts or retold the Maya stories as he knew them from his connection with the Maya people, for he is supposed to have been a full-blooded Maya Indian. These books, we are told, recite all the old traditions which still lingered in the memory of the natives of Yucatan with whom the writer came into contact. They lay long in manuscript, and were copied in whole and in part several times. Brinton, the American scholar, had a copy of them made and published under the title of "Maya Chronicles," in the first volume of his 'Library of Aboriginal American Literature.' The name given to them by Brinton admirably defines their scope, for they are, in reality, short chronicles dealing with divisions of time, for the most part, with legends, stories and events that are collected around the "Katuns," or dates. These books are very valuable for the light they throw on Maya customs and habits previous to the coming of the Spaniards to Yucatan. They also serve as a starting point from which to reckon back the Maya time as given in the few existing manuscripts written in the old Maya script.

CHILBLAIN, or FROSTBITE, a mild or severe inflammatory reaction from the effects of severe cold on the toes, fingers, nose, chin, ears, etc. In mild cases there is swelling only, with an inflammation of the skin. This disappears and the part is apt to be tender. In severe frostbite there is ulceration and sloughing of the part. The treatment of mild chilblain is by slow raising of the temperature of the chilled part to that of the body. Too rapid heating results disastrously.

CHILCOTT, Ellery Channing, American agriculturist: b. East Hamburg, N. Y., 8 April 1859. He was educated in the common schools and at the Friends' Institute of East Hamburg. From 1882 to 1892 he was owner and manager of a stock ranch in Campbell County, S. D., and at the same time acted as United States deputy surveyor. He was elected to the State senate in 1892, was professor of agriculture 1892–97, professor of geology and agronomy and vice-director 1897–1905 of the South Dakota Agricultural College. From 1893 to 1905 he was agriculturist of the United States Experiment Station, South Dakota, and in the last named year was placed in charge of dry-land agricultural investigations of the bureau of plant industry. He wrote 'A Study of Cultivation Methods and Crop Rotations for the Great Plains Area' (1910), bulletin issued by the Department of Agriculture.

CHILD, Francis James, American scholar and educator: b. Boston, Mass., 1 Feb. 1825; d. Cambridge, 11 Sept. 1896. He was Boylston professor of rhetoric and oratory at Harvard from 1851 till 1876, when he exchanged for the

chair of English literature which he held until his death. His principal work, 'English and Scottish Ballads' (10 large volumes), a subject on which he was the highest authority in this country, he improved and enlarged for publication 1882–98. Among his other works are 'Four Old Plays' (1848); a collection of 'Poems of Sorrow, Comfort, Counsel and Aspiration' (edited 1865); and 'War Songs for Freemen' (edited 1862). He also published, in 1855, the 'Poetical Works of Edmund Spenser,' five volumes, with notes, introduction and explanations, the best edition of Spenser to date.

CHILD, Frank Samuel, American Congregational clergyman: b. 20 March 1854. He was educationed at Hamilton College, N. Y., and after graduating from Union Theological Seminary in 1878 was ordained to the ministry. Since 1888 he has been pastor of the First Church of Fairfield, Conn. He received the degree of D.D. from Hamilton College and Litt.D. from Alfred University; is president of the Fairfield Historical Society and lecturer on literary and historical subjects, corresponding secretary of the Francis A. Palmer Fund for Education, trustee of several colleges and other educational and benevolent institutions and a contributor to the press. He has published 'An Old New England Town' (1895); 'The Colonial Parson of New England' (1896); 'A Colonial Witch' (1897); 'A Puritan Wooing' (1897); 'The House with 60 Closets' (1899); 'An Unknown Patriot' (1899); 'The Little Dreamer's Adventure' (1900); 'Friend or Foe' (1900); 'Fairfield, Ancient and Modern,' a history (1909); 'An Old New England Church,' a history (1911) and numerous historical pamphlets upon Colonial New England.

CHILD, Sir Josiah, English merchant: b. London 1630; d. there 1699. The work by which he is known is entitled 'Brief Observations Concerning Trade and the Interest of Money, by J. C.' (London 1668). An enlarged edition was published in 1690, under the name of 'A New Discourse on Trade.' The work has been several times reprinted. It was written in defense of the reduction, by legal enactment, of the rate of interest on money from 8 to 6 per cent, and recommends a further diminution to 4 per cent. He was for some time chairman and governor of the East India Company, and wrote several papers, without signature, in defense of the traffic with the East, arguing, in opposition to those who complained of the drain of coin, that the India trade percolated through other countries with which Britain traded and thus returned indirectly a surplus in cash. In his essay on trade he advocated the compulsory emigration of paupers to the colonies, and suggested the appointment of corporate officers called «fathers of the poor» to superintend those who were left. He became very wealthy, and his children, by three marriages, allied themselves with the highest nobility. Charles II made him a baronet (1678). His son became Earl Tylney, but the title is now extinct.

CHILD, Lydia Maria Frances, American prose writer: b. Medford, Mass., 11 Feb. 1802; d. Wayland, Mass., 20 Oct. 1880. She was married to David Child, a Boston lawyer, educationalist, diplomat and soldier in 1828. Her first novel, 'Hobomok,' was written and published in 1821. From this time until her death she continued her literary activity. She was an ardent abolitionist, and published one of the first anti-slavery books, entitled 'Appeal for that Class of Americans Called African,' one immediate result of which was the loss of her former literary popularity in the Southern States From 1843 to 1844 she and her husband edited the 'Anti-Slavery Standard.' She began the publication, in 1826, of the *Juvenile Miscellany,* which she continued for eight years. This was the first monthly periodical for children published in the United States. Among her numerous works, some of which had a very large circulation for their day, are 'The First Settlers of New England' (1829); 'Philothea, a romance of Greece in the days of Pericles' (1835); 'Fact and Fiction' (1846); 'Isaac T. Hopper: A True Life' (1853); 'Progress of Religious Ideas' (1855); 'Looking Toward Sunset' (1864); 'Miria: A Romance of the Republic' (1867); and 'Aspirations of the World' (1878). A collection of her letters, with an introduction by John G. Whittier, and an appendix by Wendell Phillips, was published in 1882.

CHILD LABOR. The term «child labor» is difficult to define because what is regarded as labor in one community or under certain conditions is often not so regarded in other communities or under other conditions; neither is there agreement as to the length of childhood. The definition of the term depends upon the state of public opinion and upon the crystallization of that opinion in the form of restrictive and constructive measures for the benefit of children. In the early days of the movement in England to protect children from economic exploitation, the term was understood to apply only to the employment of very young children in mills and mines. Gradually its application was broadened to include the work of children in many other establishments and occupations and the minimum age limit for employment was raised. To-day in the United States, not only the employment of children by merchants, manufacturers and mine operators is considered as child labor, but also the independent activity of boys and girls for gain, as in the so-called street trades of newspaper selling, bootblacking and peddling, in which the child is virtually in business on his own account. There is also a growing conviction that the labor of children in agricultural pursuits and domestic service, which are not now regulated by law and heretofore have been commonly looked upon as wholly beneficial occupations, also may be objectionable under certain conditions. The possibility of exploitation in any line of work is now generally recognized and this more enlightened public opinion has caused a steady expansion in the application of child welfare principles, until now every use that is made of children industrially is subject to careful scrutiny. The United States bureau of the census in its report of the 13th census uses the term «gainful workers» as applied to children, to include all workers except those working at home merely on general household tasks, on chores, or, at odd times, on other work. There is no definite period fixed as the result of scientific inquiry to mark the limit of childhood

in respect of ability to labor, but for purposes of regulation in this field the age of 16 years is generally accepted as marking the transition from childhood to youth.

Extent.— According to the United States census for 1910, there were engaged in gainful occupations in this country 1,990,225 children from 10 to 15 years of age inclusive, or 18.4 per cent of all the children belonging to this age group. Nearly half of these were under 14 years, the number of such children exceeding by more than 100,000 the corresponding number in the census report for 1900; this increase, however, was confined to those in agricultural pursuits, and the number of children under 14 years of age engaged in other occupations was reduced almost half (from 186,358 to 95,839). The bureau of the census attributes the increase in the number of child agricultural workers to the more exacting nature of the instructions given to the census enumerators in 1910 as compared with those given in 1900, rather than to any marked change in the actual extent of child labor on the farms.

Public opinion against the employment of older children (those 14 and 15 years of age) has been steadily growing, and even before 1910 several States had forbidden the employment of children under 16 in certain dangerous occupations, but not until after this census was taken did any State, with the single exception of Montana, attempt to establish an age limit higher than 14 for employment in the common kinds of work other than agriculture and domestic service. Therefore we find a far smaller decrease in the number of older child workers, 461,806 children 14 and 15 years old being reported in non-agricultural occupations in 1910, as against 501,849 10 years earlier. The distribution of child workers in the United States, among industries, by age groups, according to the census of 1910, is as follows:

Industry	Children reported		
	10–13	14–15	Total
Salt, oil and gas wells	28	205	233
Public service (not elsewhere classified)	84	707	791
Quarries	224	1,120	1,344
Liquor and beverage industries	115	1,327	1,442
Chemical and allied industries	187	3,132	3,319
Paper and pulp industries	154	4,652	4,806
Professional service	805	5,628	6,433
Metal industries (except iron and steel)	252	6,971	7,223
Clay, glass and stone industries	1,234	9,161	10,395
Cigar and tobacco factories	1,843	8,723	10,566
Food and kindred industries	972	10,245	11,217
Leather industries	406	11,592	11,998
Printing and bookbinding	622	11,482	12,104
Mines	2,241	14,877	17,118
Iron and steel industries	951	19,518	20,469
Lumber and furniture industries	4,367	17,418	21,785
Clothing industries	1,113	22,158	23,271
Transportation	3,041	21,777	24,818
Miscellaneous industries	2,064	28,093	30,157
Building and hand trades	5,008	27,657	32,665
Textile industries	14,642	65,888	80,530
Trade	22,441	88,965	111,406
Domestic and personal service	33,045	80,510	113,555
Agriculture, forestry and animal husbandry	800,137	632,443	1,432,580
Totals	895,976	1,094,249	1,990,225

The occupations which, according to the census for 1910, show the highest percentage of children engaged as based upon the total number of workers of all ages in each, are given in order in the following table:

	Number		Per cent		
	Total, 10–15	Total workers	Total, 10–15	10–13	14–15
Workers in all occupations	1,990,225	38,167,336	5.2	2.3	2.9
Newsboys and newsgirls	20,450	29,708	68.8	40.6	28.2
Telegraph messengers	4,612	9,152	50.4	6.3	44.1
Messenger, bundle and office boys and girls	52,187	108,035	48.3	6.4	41.9
Farm* and dairy farm laborers	1,419,098	5,982,514	23.7	13.3	10.4
Bakery employees (semi-skilled)	1,267	8,938	14.2	1.3	12.9
Bootblacks	1,831	14,020	13.1	5.4	7.7
Cotton mill employees (semi-skilled)	35,651	278,625	12.8	3.6	9.2
Knitting mill employees (semi-skilled)	9,129	‡72,750	12.5	1.6	10.9
Paper box factory employees (semi-skilled)	2,089	17,887	11.7	0.4	11.3
Silk mill employees (semi-skilled)	8,264	78,773	10.5	0.5	10.0
Candy factory employees (semi-skilled)	2,900	30,943	9.4	0.4	9.0
Tinware and enamelware employees (semi-skilled)	912	10,611	8.6	0.6	8.0
Glass factory employees (semi-skilled)	2,886	41,877	6.9	0.6	6.3
Woolen and worsted mill employees (semi-skilled)	6,670	98,970	6.7	0.2	6.5
Stock herders, drovers and feeders	3,422	59,250	5.8	2.8	3.0
Servants	89,508	1,572,225	5.7	1.8	3.9
Cigar and tobacco factory employees (semi-skilled)	8,422	151,519	5.6	0.9	4.7
Printing and publishing establishment employees (semi-skilled)	3,491	67,469	5.2	0.2	5.0
Turpentine farm laborers	1,389	27,557	5.0	2.3	2.7
All clothing factory employees (all semi-skilled)†	16,955	350,541	4.8	0.2	4.6
Electrical supply factory employees (semi-skilled)	1,190	24,677	4.8	0.1	4.7
Textile dyeing and finishing mill employees (semi-skilled)	721	‡15,764	4.6	0.2	4.4
Clerks in stores	15,692	387,183	4.1	0.1	4.0
Shoe factory employees (semi-skilled)	7,453	181,010	4.1	0.1	4.0
Carpet mill employees (semi-skilled)	1,208	‡29,854	4.0	0.1	3.9

* Home farm and working out.
† Hat factory employees not included.
‡ Total workers are not given in the volume and had to be computed; may include a few *not* semi-skilled who were with the unclassified.

Census figures are necessarily inadequate for the purpose of revealing the actual extent of child labor, inasmuch as they are gathered at a certain time of the year and therefore cannot show conditions existing in seasonal occupations at other periods. The data for 1910 were collected in the month of April, when, for example, very few fruit and vegetable canneries were in operation, and consequently only 49 children 10 to 13 years of age were reported as employed in such establishments over the entire country; later in the year when the fruit and vegetable seasons occur, great numbers of canneries are running and children of these ages are quite generally found at work in them, especially in those States which have granted specific authorization to this industry for their employment. Furthermore the number of children engaged in street trading is evidently understated in the census report, probably because many parents, in replying to the questions of enumerators concerning the occupations of their children, did not regard newspaper selling, bootblacking or peddling as within the meaning of that term and hence a large number of boys and girls so engaged were probably returned as having no occupation. This is indicated by the return of only three newsboys, including adults, for Chattanooga, a city of 45,000 inhabitants; and of only 243 newsboys 10 to 15 years of age for the great city of New York, while 240 of the same ages were reported for Toledo whose population is only one-thirtieth of New York city's. In neither of these two cities were children of these ages forbidden in 1910 to sell newspapers. For eight cities with more than 25,000 inhabitants no bootblacks whatever, either adults or children, were reported. In view of these facts and the lack of any report as to workers under 10 years of age (about whom no statistics have as yet been published by the bureau of census), the number of children under 16 years of age engaged in gainful occupations in 1910 must have been somewhat in excess of 2,000,000.

Effects.— As to the physical effects of child labor very little is known, aside from the findings of a few isolated studies and the opinions of individual observers not based on prolonged investigation. Professor Teleky of the University of Vienna has shown that child laborers are especially susceptible to tuberculosis and that for the period of years covered by his study there was a steady increase in the general sickness rate and industrial strain among children who left school to go to work. He urges that the employment of children under 16 years be prohibited, and that the hours of labor for those between 16 and 18 years be rigidly curtailed to afford opportunity for continued education and recreation.

The lists of accidents to workers reported by State departments of factory inspection show that employees under 16 years of age suffer more mishaps than do those who are older, in proportion to the total number of such employees. This is to be expected because of the immaturity and natural spirit of playfulness in children which make them more liable to accident than adults, especially when employed about dangerous machinery or in other places where the risk is great; and so, among the working classes, one not infrequently finds crippled children whose condition is due to misfortune met with in the course of work.

The effects of labor upon the schooling of children are manifest wherever the system of child employment is found. The States of Mississippi, Alabama, South Carolina, North Carolina, Arkansas, Georgia, Texas, Tennessee, Florida and Louisiana, in the order given, had the largest percentages of children under 14 years of age at work in 1910, and were also among those having the highest percentages of illiteracy in their total population. These same States have been the last to enact compulsory school attendance laws — in several of them the application of the requirements adopted is subject (1918) to local or county option. In any community the presence of child labor and the absence of compulsory education produce illiteracy, for the child cannot be both at work and in school at the same time, and, as practically the only opportunity for elementary education comes in childhood, the child who neglects it or is denied it almost certainly becomes the illiterate adult.

If the child attends school irregularly or attends regularly but works at other hours, the effect is evident in his standing or scholarship. He fails to keep up with his class and is obliged to repeat the work of grades that is intended to require only one year for completion. In other words, he becomes retarded. This effect of retardation among working children is brought out by several studies made by the National Child Labor Committee. In the city of Toledo it was found that 55 per cent of the children who were attending four public schools and devoting their time outside of school hours to trading in the streets were enrolled in grades below those in which they naturally belonged according to their ages, while of the entire number of pupils only 36 per cent were retarded. In the State of Colorado 5,000 boys and girls under 16 years of age were found at work in the sugar-beet fields in 1915; they were kept out of school to assist in the cultivation and harvesting of the crop and as a result 54 per cent of them were backward, as against only 20 per cent of the non-beet-working children, and yet their teachers declared that they would have been just as far advanced as the others if they had attended as regularly. Child labor in any form must not be allowed to interfere with attendance at school, if the benefits of education are to be realized.

Remedies.— The remedies for child labor conditions may be divided into two groups, one embracing restrictive measures and the other constructive ones. The restrictive measures are found in legislation adopted by the nation, the State and the municipality for the control of child employment and in the machinery provided for the enforcement of such legislation. A State child labor law of general application, in order to be effective, must prohibit employment below a certain age limit in ordinary occupations, fix a higher age limit for dangerous work, regulate the hours of labor of children above the minimum age limit and require of them the completion of a certain amount of schooling, proof of age and physical fitness as qualifications for official work-permits, make certain officers responsible for the enforcement of the law and fix the penalties for its violation.

The age limits commonly adopted by the States of this country are 14 years for ordinary occupations in factories, workshops, stores, offices, restaurants, etc.; 16 years for dangerous work such as mining, quarrying, the operation of dangerous machinery and employment in the dusty trades or where paints, acids, dyes, gases, etc., are made or used; and 18 years for extra-hazardous occupations about railroads, blast furnaces, hoisting machines or where phosphorus, explosives or liquors are made or handled.

A majority of the States limit the work-day of children between 14 and 16 years to 8 hours. In some States this regulation does not apply to all kinds of establishments, but factories are affected wherever it has been adopted. Other States prescribe a nine-hour work-day for such children, some allow 10 hours and a few place no limit whatever upon hours of labor. Work at night by children under 16 years of age is prohibited by almost all the States.

The range in the requirements for the issuance of work-permits to children between 14 and 16 years is very great. A few States make practically no requirements while others demand completion of the elementary school course of eight years, physical fitness for work as determined by authorized physicians, as well as documentary proof of age and written promise of legal employment. The permit is issued in most States by the local public school authorities, in a few others by the State factory inspectors or board of health. It is kept on file by the employer of the child for examination by inspectors and therefore serves as the basis for the enforcement of the child labor law. Its careful issuance under strict requirements is therefore a very important part of any program of child protection.

The machinery provided for enforcement of the law varies with the nature and stage of development of the industries carried on in each State, and also depends upon the extent to which the law applies to these industries. For example, in Mississippi, where at the present writing the child labor law affects only mills, factories and canneries, and where the number of such establishments is comparatively small, one factory inspector is charged with the duty of seeing that it is obeyed; in New York the law applies to factories, stores, offices, restaurants, hotels, tenements, bowling alleys, barber shops, places of amusement, bootblack stands, mines, quarries, distilleries, breweries, to delivery and messenger service and to newspaper selling, and there is required to ensure its observance an elaborate organization which includes divisions of factory, mercantile and home-work inspection employing 150 inspectors. Most of the States have a department of labor or an industrial commission which is responsible for the enforcement of all State laws concerning the employment of children as well as of all other labor acts.

The adoption by the States of such a variety of standards led to a movement having as its object the bringing about of some degree of uniformity in the legislation on this subject, and a so-called Uniform Child Labor Law was drafted by the National Child Labor Committee and recommended to the States for adoption by the United States Commissioners on Uniform Laws of the American Bar Association. This effort had some effect, but the desired degree of uniformity was not attained. A few of the States neglected to pass laws embodying even the essential minimum standards. Attention was then turned to the possibility of control by the Federal government and as the Federal constitution grants to Congress the power to regulate interstate commerce, agitation was begun for the passage of a bill forbidding the shipment in interstate commerce of goods produced (1) in mines or quarries where children under 16 years of age were employed; (2) in factories where children under 14 years were employed; (3) in factories where children between 14 and 16 years were employed more than eight hours a day; and (4) in factories where such children worked at night. This bill was enacted into law by Congress in 1916 and on taking effect (in 1917) established a uniform minimum standard throughout the country so far as child labor in mines, quarries and factories is concerned, because the products of practically every such industry throughout the country are shipped in interstate commerce. The States are, of course, free to adopt standards higher than those fixed by the Federal law, and all forms of child labor not affected by its provisions are still subject only to State regulation.

The constructive measures in the program of child labor reform embrace compulsory attendance at school, the development of industrial education and the providing of opportunity for further instruction and recreation through the establishment of special schools, libraries, clubs, playgrounds, baths, etc. These form what is generally referred to as the constructive side of the movement, while restrictive legislation is known as the prohibitory part. These two elements are necessary in any well-balanced program for social welfare and especially so in child labor reform, because when the child is denied employment in industry a substitute that is better both for him and for society must be offered in its place.

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EDWARD N. CLOPPER,
Secretary for Northern States, National Child Labor Committee.

CHILD PSYCHOLOGY. Child psychology is the study of the growth or development of mind during the first few years of life and of the mental characteristics during the early stages of development. It may be contrasted with the psychology of infancy, of adolescence, of maturity and of senility. See CHILD STUDY; GENETIC PSYCHOLOGY; PSYCHOLOGY.

CHILD STUDY. A branch of study concerned with the physical, mental and moral life of the child from birth through infancy and adolescence to adult age. It thus includes child psychology, dealing with the mental life of children, overlaps into genetic psychology (q.v.), and may just as properly be further subdivided into child physiology, child pathology, child sociology, etc. Lately every phase of the Child-Welfare Movement has come to be grouped under the general name of child study. The field as a whole covers every phase of child-life, individual and collective, and involves everything known or knowable about the growth and development of human beings from birth to maturity. To treat of so comprehensive a subject in a single encyclopædia article is obviously impossible. The reader will find some of its more important subdivisions treated elsewhere under their appropriate headings, while this article will be confined to the narrower field of the physical and mental life of the child. Even of these two phases of the subject space permits but a mere outline of its aims and methods and a general statement of some of its principles and results.

History.—As scientific interest in children arose first in the classroom, it is but natural that the earliest students of child-life should have been educators. It is indeed with such educational reformers as Rousseau, Basedow, Comenius, Froebel and Pestalozzi that child study may be said to have originated. The interest aroused by them in the child as a separate entity proved so strong that the 19th century saw the birth of a well-nigh universal child study movement. In Germany Preyer's, 'The Mind of the Child' was the first important manifestation of this interest, while Darwin's published extended observations of early childhood gave considerable impetus to child study in England. But it remained for Stanley Hall, the famous American educator, to make child study the popular subject that it is to-day both here and abroad. The field which had formerly been pre-empted almost exclusively by educators, for child study was long considered as only a handmaiden of pedagogy, has rightly been entered by parents and others interested in the numerous phases of the subject—from child labor to juvenile delinquency and children's courts (q.v.). Naturally a vast literature has already grown up on this subject, while the number of child study federations runs into hundreds.

Aims and Methods.—The necessity for a special study of childhood, especially for a child psychology, arises from a few essential structural and functional differences existing between the adult and the child. These differences are not only physical, but physiological and psychological; and they include differences of kind as well as of degree. Besides the obvious anatomical differences in the child—such as shorter legs and a relatively longer trunk and larger head—and the less obvious physiological differences—such as a higher pulse rate, a relatively greater heart action and a correspondingly faster respiration—there is a most marked difference in psychological processes. Some of these the human child seems to exercise even in infancy, while others come in weak form in later childhood; but a few are entirely wanting before maturity. For all these reasons, the old notion that the child is a miniature copy of man has long been eradicated by psychologists. But despite these reasons for making child study a separate branch of investigation, it cannot be considered as entirely unrelated to the other sciences dealing with the life of man. If it is fallacious to study the child as if he were a little man; it is equally unscientific to do so without regard to his potential manhood.

Just as the child's mental processes differ in kind from those of the adult, so the methods of studying them must be modified or even changed altogether. For instance, the method of introspection (q.v.), the principal method of general psychology, is unavailable in child psychology, since the power of introspection does not appear much before adolescence. For want of direct introspection, the methods of observation and experimentation must be relied upon. The first, known as the "diary method," consists in carefully recording a child's progressive development as actually noted by the observer, usually a parent. The great Pestalozzi kept a diary of this kind in which the doings and sayings of his son were minutely recorded. Another famous instance is Darwin's 'Biographical Sketch of an Infant' (1877), dealing also with his own son. There are numerous published records of this sort—notably Perez' 'The First Three Years of Childhood' and Preyer's 'Mental Development in the Child'—and much important information bearing on the sensory and motor development of the infant has already been obtained from them. For the study of infancy no better method has yet been devised, and in the hands of trained observers it yields excellent results.

The experimental method, known also as the method of Mental Tests (q.v.), is usually applied to children of school age. Devised by educators and used by them for purposes of experimental pedagogy, these tests seek to determine the child's mental ability as shown by his reaction-time, visual and auditory sense-perception, power of concentration, the curve of fatigue, etc. The advantages of this method over the other are that it deals with children collectively rather than as individuals, thus furnishing data of greater scientific value, and that the personal equation of the parental or other doting observer of an individual child is here entirely eliminated. Thus, while the diary method is far more comprehensive, extending as it usually does over years, the experimental

method is generally more scientific. Notable specimens of collective studies of children are Sully's 'Studies of Childhood' and Baldwin's 'Mental Development in the Child and in the Race.' But a sufficiently large number of individual studies, properly analyzed and interpreted, may yield results that are equally reliable. As both methods have their obvious limitations, neither of them is self-sufficient for scientific child study and each should be used to supplement the other.

Another method, which really partakes somewhat of the nature of the two methods already mentioned, is known as the "questionnaire method." This involves reports on the child's behavior made by parents, teachers and others in response to special lists of questions prepared for them. In so far as this method depends upon partial and untrained observers, it is open to the same objections as the diary method. The accuracy of the final conclusions reached by this means is often still further impaired by arbitrary classification and interpretation on the part of the question-framer, who cannot be aware of the conditions under which the information solicited was obtained. For these reasons this method, save under exceptionally favorable circumstances, has proved of little scientific value. Few psychologists have ever used it, and fewer still use it at present.

Finally, mention might here be made also of another means — it is in no sense a method — of getting indirect light on the intricate problems of child study. This is a sort of "reminiscent introspection" by which adults, usually authors, attempt to resurrect for us their childhood experiences. The famous autobiographies of Tolstoy, Loti and John Stuart Mill afford such reminiscences. The danger of reading into such recollections elements belonging to a later period of development is indeed very great. Even in cases of unquestioned sincerity such reminiscences of childhood are apt to assume the nature of romantic autobiography.

Such other methods as are used in child study are not peculiar to this subject, but are borrowed from the other sciences — physiology, anthropometry, etc. — dealing with the physical nature of man. These, therefore, need not be described in the present article.

Principles and Results. — The fundamental principle of child study, that the child is not to be considered an adult in miniature, has already been referred to. Another essential consideration which must ever be borne in mind in this connection is that, both physiologically and psychologically, the child is a more dynamic being than the adult. The latter need but live, whereas the former must *live and grow*. The adult's physiological existence is better co-ordinated and regulated; hence there is greater equilibrium in his case. The child, on the other hand, owing to continuous growth and consequent readjustment, is in a constant state of flux. Hence his restlessness and lack of concentration, which unenlightened teachers and ignorant parents vainly deplore. A third guiding principle in child study is that children vary less among themselves than adults, presenting a uniformity which increases inversely as their ages. Still another controlling truth is the most significant recognition that play is the child's chief business in life. The old notions that play in the child serves no purpose other than that of mere recreation, or that it is but an outlet for surplus energy, have long been abandoned. In their stead — and there were many variations of these fallacies — the view that play in childhood has a very important ulterior end has won universal acceptance. The recognition of the educational and biological significance of play, a direct corollary of the general theory as to the meaning of infancy, has revolutionized modern child-training and education.

The most concrete results of child study have, naturally, been physical or physiological. In these respects the division of the period of childhood into different stages, according to marked lines of development, may be considered the most important step. While there is still no complete agreement among writers on child study as to the exact years marking the boundaries, these three periods may be accepted as approximately correct: (1) *Infancy*, the first six years — about a year less for girls; (2) *Childhood*, the 7th to the 12th year — about two years less for girls; and (3) *Adolescence*, from the close of childhood to about the 25th year — about the 21st for girls. The impossibility of establishing very exact boundaries here is due to numerous variations from the normal stages of physical development. Such individual differences may result from various causes — prenatal tendencies and environmental influences — and must always be reckoned with in making general deductions from child study. In spite of these difficulties, however, it has been determined that all normal children grow very rapidly during the first five years, at a slower rate from 5 to 12, faster again till about the 14–15th year, and at a rapidly decreasing rate thereafter till the age of maturity. But even these generalizations must be qualified by the statement that the rates of growth here indicated do not necessarily imply parallel or uniform development in height and weight or for all parts of the body. For a child of seven may happen to have the weight of an eight-year-old and the height of one who is but six. Nor should the essential differences between the growth of boys and girls ever be lost sight of. For instance, the rate of growth before the close of the prepubertal period is faster for girls than for boys, making the former heavier than the latter. Again, girls attain the normal height of adulthood at the age of 18, while boys are not full-grown men before the 20th or 21st year. Sexually, too, girls mature considerably earlier than boys, passing through the period of adolescence (q.v.) about four years sooner, as already indicated.

While on the psychological phase of child study the results so far obtained are naturally more vague, their importance must not be underestimated. Apart from such lessons of general psychology as have a bearing on the mental development of the child, perhaps the most practical result in this new field of study is the formulation of a graduated scale of child development by which the normal growth of mentality can be readily ascertained. This standard table, known as "Binet's Metrical Scale of Intelligence," has been found so nearly correct for the average child that, with

some modifications and extensions (see MENTAL TESTS), it has been adopted by students of child psychology and teachers everywhere. Still, it cannot be said that experimental psychology has done as much for child study as have the other biological sciences. Even the typical child mind has not yet been satisfactorily determined, a task performed for the adult mind long ago. Yet until this is accomplished by child psychology, it can hardly be considered a science. But even so the psychology of childhood has, to quote Professor Thorndike, "acquired facts concerning instinctive tendencies, the gradual maturing of capacities, the tendencies useful or harmful in children's habits of observing, associating and reasoning, the actual kinds and amounts of knowledge which they may be expected to possess at different ages and under different conditions, their likes and dislikes, the relation of their mental to their physical well being, and the like."

Specifically, and according to the periods of childhood already outlined, the following facts have been fully established in regard to the child's mental development.

The human infant is at first essentially a sensory and motor animal whose mental life, apart from the emotions of anger and fear, is confined almost exclusively to sense-perception. With the acquisition of language comes the earliest indication of conscious meaning. Then the mental life of the child really begins. Imagination develops rapidly and tends to obliterate for the child the dividing line between fact and fancy, which is so exasperating to the adult, whose imagery is never so vivid as that of the child. In general, spatial perception precedes temporal, and both come much before color discrimination. Ideas of time-intervals dawn rather late upon the child's mind, and the sense of rhythm is often a very slow acquisition. The modes of learning for infancy seem to consist of the "trial and success method" and unconscious imitation.

With the advent of childhood come conscious imitation, a rapid extension of purposive activity, an enlargement of the field of sense-perception, and a corresponding enrichment of mental life generally. Actual experiments have shown that an average child doubles or trebles its power of sense discrimination between the years of 6 and 16. There is probably a corresponding rise in the child's entire mental life at this stage of development. It is certain, at any rate, that the power of immediate memory keeps on increasing till about the 15th year, after which it remains stationary. The power of logical memory, however, continues to increase. In emotional life childhood differs but little from adulthood. Every emotion known to the latter, with the single exception of the sexual, are experienced in the former, though naturally in a cruder and simpler form.

The most striking characteristics of the adolescent period, which is decidedly a period of transition, are the rapid growth of the emotions, the higher sentiments, and of individualism, which are either effects or correlatives of the sexual awakening that comes in this period and largely dominates many of its manifestations. Altogether, it is a very critical period in the life of the young man or woman — as critical psychologically as infancy is physically — a period calling for more patience, tact and sympathy in parents and teachers than any other. It is then that intellectual, æsthetic, moral or religious life really begins.

Among the general results of child study mention should be made at least of the conclusion reached by psychologists that childhood, though necessarily a preparation for adulthood, is to be passed through by the child entirely for its own sake. Nor should its various stages be hurried or compressed, save under very unusual circumstances. For it is believed that the best possible preparation for adulthood is to absorb fully the various influences and experiences characteristic of each preceding age; that, in other words, the person who displays the characteristics peculiar to each age in the fullest degree will ultimately attain a higher type of manhood or womanhood than one upon whom adult characteristics are forced prematurely. In this connection passing mention must be made, too, of the quickening of the parental conscience as one of the far-reaching results of child study, thanks to which the serious responsibilities of parenthood are coming to be better realized. The vogue of "eugenic marriages" and the cry for "better babies" are but superficial manifestations of the deeper tendency making for an enlightened parenthood. See ADOLESCENCE.

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DAVID A. MODELL.

CHILD WELFARE. See CHILD LABOR; FEDERAL CHILDREN'S BUREAU; LABOR LEGISLATION; MOTHER'S PENSIONS.

CHILDBIRTH, Painless. That women in travail have always suffered more or less pain seems probable, since the writer of Genesis quotes God as saying in the primæval curse: "In sorrow thou shalt bring forth children." Yet there are many reasons for believing that labor for the primitive woman was more purely a physiological process and therefore less painful than it is to-day. Normal physiological processes are painless. The sensation of pain is caused by the abnormal and is usually suggestive of pathology. Childbirth being a natural function of woman should be physiological and therefore relatively painless.

Very easy and practically painless labors are still observed but they are now the exception since most women suffer more or less intense pain during the second or expulsive stage of labor. The more difficult labors of to-day result from several factors, the more important being the intermarriage of races, the development of the brain, the survival of the physically unfit, and the abnormal methods of dressing and living. Civilization, at the same time, has developed in woman a more sensitive nervous system which is less able to endure the shock of pain.

The belief that pain is an inevitable accompaniment of labor has reconciled most mothers to endure it, while the joys of successful motherhood have caused them to forget it. There is, however, no logical reason why women should suffer during labor. Suffering, physical or mental, produces surgical shock; it increases the dangers of puerperal complications, and delays the convalescence. When labor becomes pathological and therefore painful, the physician should endeavor to minimize and relieve this pain with the same skill he shows in the care of other painful conditions.

The conduct of labor among all primitive peoples was purely intuitive and very little or no assistance was given. In difficult cases the older women of the tribe would assist with pressure, massage and nauseating drinks. In the earlier stages of civilization some of the older women assisted during labor and the priests gave spiritual assistance (mental suggestion) or mechanical assistance in difficult cases.

The ancient Greeks appreciated the increased susceptibility of the nervous system of women during pregnancy. "The law in Carthage and Athens forbade the pursuit and punishment of a criminal or murderer who sought refuge in the house of a woman who was pregnant or had recently given birth to a child." (Englemann). There is also considerable evidence in the Greek literature that an attempt was made to relieve the suffering of labor by anæsthetizing agents and other means.

To mention the various drugs which have been used in the attempt to relieve the pain of labor would necessitate the listing of every drug thought to have hypnotic, sedative, analgesic or anæsthetic properties. Hypnotism and mesmerism have been used successfully and the value of mental suggestion has long been appreciated.

The drugs most used by the ancients were probably cannabis indica (Indian hemp; hashish), mandragora and opium. Of these opium is still employed, although its limitations have been recognized for at least a century. W. P. Dewees wrote in 1819, "I have in a number of instances seen opium exhibited with a view to mitigate the severity of the pain, when labor advanced slowly, and have never failed to observe that the force of the contraction was diminished at the time it was required to be the strongest."

James Y. Simpson in January 1847 used ether to produce analgesia in midwifery and inaugurated the first consistent effort to relieve the severe pain of labor. Flourens in March of the same year announced the anæsthetic properties of chloroform, and Simpson in November read his paper entitled, "Notice of a New Anesthetizing Agent as a Substitute for Sulphuric Ether in Surgery and Midwifery." Because of superstition and religious prejudice these anæsthetizing agents at first were opposed by both the profession and the laity. However, following its use by Queen Victoria in 1854, chloroform *à la reine* became the fashion and analgesia was maintained for many hours in large numbers of cases. Protheroe Smith in a letter to Simpson stated that he had used chloroform analgesia for 28½ hours. Simpson himself used it for over 13 hours.

Chloroform being more pleasant and more efficient quickly replaced ether. While the fact that it is more dangerous than ether was soon discovered, from the greater number of fatalities in surgical cases, the delusion was long maintained that the pregnant woman had a special tolerance for chloroform. Within recent years most authorities have shown a preference for ether because of its greater safety, and, with the newer methods of administration, its efficiency has been increased to some degree. Both have proved of great value in many thousands of cases. Some deaths undoubtedly have resulted from their use but they have been the means of saving hundreds of lives.

Both ether and chloroform have the fault of opium in that they weaken the uterine contractions and anæsthetize the fetus *in utero*. Because of their limitations and slightly greater dangers these anæsthetics are gradually being supplanted by nitrous oxid-oxygen analgesia.

Klikowitsch of Petrograd applied nitrous oxid-oxygen analgesia to 25 obstetrical cases in 1880. He found that three or four inhalations of this mixture rendered the uterine contractions painless without clouding the consciousness. He observed that its action was different from that of opiates, ether and chloroform, in that the uterine contractions were often stimulated and that in no case was there any diminution in their frequency or strength. The following year Winckel of Dresden used the nitrous oxid-oxygen analgesia in 50 cases with satisfactory results. "The apparatus, which consists of a rubber bag like a pillow, is inconvenient, it must be confessed, but this is entirely subordinate; in abnormally painful labor it is at any rate an extremely important remedy." (Winckel). But owing to its cost, the impurity of the gases used, the crudeness of the apparatus, and the fact that it was often given to the stage of asphyxia, nitrous oxide did not become popular at that time.

Dr. J. Clarence Webster of the Presbyterian Hospital, Chicago, was one of the first in America to use nitrous oxide in obstetrical practice. In 1904 he began to use this anæsthetic in operative obstetrics when ether and chloroform were

contraindicated. Gradually its use was extended to normal cases as a substitute for ether during the delivery of the child. The use of the nitrous oxid-oxygen analgesia during the entire painful stage of labor has been developed during the past few years largely as a result of the constantly increasing demand for painless childbirth.

Von Steinbüchel of Gratz in 1902 suggested the use of scopolamin-morphine analgesia in obstetrics. Gauss of Freiberg in 1906 made the first report of these drugs given in small graduated doses based on a memory test. Because of the semi-sleeping condition of the patient he called this treatment the "Dämmerschlaf" (Twilight Sleep). This method has been tried by many physicians with varying degrees of success and failure. Given under the most favorable condition to selected cases the results have been satisfactory in from 70 to 90 per cent of the cases. Most users of scopolamin and morphine are now advocating these drugs only for the first or dilating stage of labor. Some anæsthetic is usually needed for the delivery of the child.

In March 1915, Dr. Webster announced the very satisfactory results which were being obtained by the obstetrical staff of the Presbyterian Hospital, Chicago, from the use of the nitrous oxid-oxygen analgesia during the painful stage of labor. This announcement was made only after various members of our staff had tested the method thoroughly on all types of patients and it had been found efficient, easily administered and not too expensive for general adoption. Influenced by the papers of this staff, together with papers from obstetricians in other cities, this analgesia has been used successfully in several thousand cases during the past two years. It is of considerable significance that of the obstetricians who have used the nitrous oxid-oxygen analgesia long enough to develop a technic not one has questioned its value in the management of labor.

While the use of any drug may not be entirely free from the element of danger, the writer believes that the proper use of any of these drugs or anæsthetizing agents is less dangerous than is the shock of severe pain. With proper care during pregnancy, with the labor skilfully conducted, and with proper facilities for the adaptation of the various anæsthetizing agents to her individual needs, it is possible for the mother of to-day to have a relatively painless childbirth.

C. HENRY DAVIS, M.D.

Author 'Painless Childbirth, Entocia and Nitrous Oxid-Oxygen Analgesia.

CHILDE HAROLD'S PILGRIMAGE. Byron's 'Childe Harold,' despite diversity of critical opinion and the fact that it has become hackneyed through use in guidebooks and school "readers," still remains the most famous descriptive poem in English. It was written, says Byron, "as a mark of respect for what is venerable and of feeling for what is glorious." The poem is divided into four parts, or "cantos," aggregating 4,500 lines; its metre is the nine-line stanza of Spenser's 'Fairy Queen.' Though usually termed a "descriptive" poem, 'Childe Harold' is really a series of descriptive, reflective and lyrical stanzas strung on a slender thread of narrative formed by the wanderings of its eponymous hero through the countries described. But Harold figures only slightly even in the first canto, still less in the second, is scarcely mentioned in the third, and disappears entirely in the fourth. He was, in spite of Byron's too strenuous denial, never other than the poet himself.

Byron's travels through Spain, Portugal, Albania and Greece, in 1809 and 1810, furnish the subject-matter for cantos I and II, which upon their publication in 1812, caused their author to exclaim, "I awoke one morning and found myself famous." Their popularity, such as few poems have ever attained, was due largely to their posing, their showy rhetoric, and their satire, which exactly suited the taste of the age. Except for the fine stanzas on Greece (II, 73–90), however, they contain little of value. But the third and fourth cantos, published in 1816 and 1818, respectively, belong to a higher order. Within the intervening years Byron had written copiously, had grown famous, had become for a time the darling of English society, had met the great people of his day, had married — unhappily; and, finally, under a storm of unmerited abuse, had quitted England forever. His earlier poses and affectations are now laid aside, and his style is direct and mature. Canto III is devoted to Waterloo, the Rhine and Switzerland; canto IV, to Italy; with their landscapes, historical associations, great men and great events, cities, buildings and works of art. But not one half of the matter is descriptive; for the poet usually passes from description into reflection, and from this into the purely lyrical. In Italy his wanderings are easily traced, from Venice, through Ferrara and Florence, southward to Rome; but 'Childe Harold' is far from being a guidebook. Byron selects only what arouses his emotions, and presents objects only as colored and interpreted by his own personality. Yet so essentially just and adequate are many of his descriptions, such as those of Venice, Rome, the Pantheon, the gladiator, that they have become identified with the objects they describe. The contemporary popularity of 'Childe Harold,' however, was not due solely to the splendor and energy of these descriptive passages. The spirit of the age spoke in its pleas for justice and liberty, and for social, political and religious reform; and contemporary interest was quickened by the reflections on the French Revolution and Napoleon, and by political allusions and prophecies. Added to all this was the daring revelation of the poet's own complex and brilliant personality.

Despite the diversity of critical opinion, it may safely be said that 'Childe Harold' contains much poetry of a high order. Byron's passion for the grander aspects of nature finds expression in verse that fairly rises to the sublimity of his themes (on the Rhine, III, 50–56; on Night and Storm on Lake Geneva, III, 85–97; on the Marble Cascade, IV, 69–72; on the Ocean, IV, 178–84). Again, as no other poet, Byron possesses the historic imagination, can summon "the glory that was Greece, the grandeur that was Rome," and make the reader feel the desolation of once great and now fallen states (on Athens, II, 73–90; on Venice, IV, 1–19; on Rome, IV, 78–82). With all its lapses into empty rhetoric, its moral platitudes, its too ostentatious parade of the poet's "bleeding heart," 'Childe Harold' still possesses, as Swin-

burne has said, "the splendid and imperishable excellence of sincerity and strength."

MARION TUCKER.

CHILDE ROLAND TO THE DARK TOWER CAME. 'Childe Roland,' one of the most powerful and impressive, and perhaps the most widely discussed, of Browning's shorter poems, is a narrative monologue in which "Childe" (or "young lord") Roland, a mediæval knight, tells the story of his quest of the "dark tower"; though to whom he speaks, and when, and where, we never know. The poem, which is in 34 six-line stanzas, was written in one day, 3 Jan. 1852, in Paris, and was first published in the volume entitled 'Men and Women' in 1855. Its title was suggested by a single disconnected line spoken by Edgar in 'King Lear' ("Childe Roland to the dark tower came"; III, iv, l. 187); and its grotesque imagery is perhaps to be understood only in the light of the unreal and fantastic world of Edgar's fancy. The strangely impressive setting presents a series of pictures as by Albrecht Dürer, in turn terrific and grotesque, fantastic in the general impression but sharply realistic in detail. In spite of Browning's assurance that the poem is "only a fantasy," commentators have offered various interpretations of its supposed allegory, not one of which is without inconsistencies that render it invalid. Probably the poem is best taken, as the poet evidently intended it should be, simply as an effort of the imagination from which each reader may gain what he will. Possibly a broad and safe interpretation, if the reader insist upon one, is that Childe Roland's quest is the journey of life, with its dangers, failures and successes, its pursuit of an ideal through perils both real and imaginary, and its final triumph through sheer power of will. The climax of the poem is superb in the crashing finality of its long-drawn trumpet blast, defying fate and all unseen malignant forces, and claiming victory even in the midst of apparent defeat. Among the many comments and interpretations may be mentioned that by John Esten Cooke in *The Critic* (5:201, 24 April 1886); by Arlo Bates, in *The Critic* (5:231, 8 May 1886); by Mrs. Orr in her 'Handbook to Browning'; by J. Kirkman and others in 'The Browning Society Papers' (I:21); and by William Lyon Phelps in his 'Browning: How to Know Him' (pp. 231–244).

MARION TUCKER.

CHILDEBERT, shĕl'-dĕ-bâr or chĭl'dĕ-bĕrt, three kings of the Merovingian dynasty, France. (1) CHILDEBERT I.: b. about 495 A.D.; d. 558. On his father's death in 511 he succeeded to the kingdom of Paris; his brother, Clodomir, king of Orleans, having been killed in battle, Childebert and his brother, Clotaire, king of Soissons, determined to seize and divide his dominions, and murdered his two eldest sons and their followers. Childebert afterward quarreled with Clotaire and laid waste his territory. (2) CHILDEBERT II.: b. about 570; d. 596. On the death of his father in 575, he was proclaimed king of Austrasia, and subsequently, by the death of his uncle, Gontran, succeeded to the kingdoms of Burgundy, Orleans and part of that of Paris. (3) CHILDEBERT III, surnamed the Just: b. about 683; d. 711. He was proclaimed king in 695, on the death of his brother, Clovis III. His kingship, however, was merely nominal, the true sovereign being Pepin le Gros or d'Héristal, who, under the title of mayor of the palace, exercised the real authority.

CHILDERMAS (chĭl'dĕr-mas) **DAY** (Feast of the "Holy Innocents"), a festival celebrated by the Roman Catholic Church, 28 December, in commemoration of the massacre of the male children in and near Bethlehem by Herod soon after the birth of Christ. Consult Matthew ii, 16–18.

CHILDREN, Defective. Under the term "defective children" are included deaf, blind, feeble-minded, epileptic, crippled and incurable children. The treatment of the deaf and blind is generally recognized as an educational problem, and will therefore be discussed under BLIND, EDUCATION OF THE; DEAF, EDUCATION OF THE.

The Problem.— The problem of the feeble-minded has come to be recognized as one of the most difficult and acute social questions. It has long been known that a considerable number of the inmates of reformatories and prisons were mental defectives but until recently there was no means of determining what proportion of them belonged to this class. Within the past few years there have been devised the Binet-Simon tests, and other tests for ascertaining the mentality of children. These tests have been applied to inmates of reformatories in large numbers, and it has been discovered that from 5 per cent to 25 per cent of the boys, and from 20 per cent to 50 per cent of the girls in such institutions are distinctly feeble-minded. It is more difficult to ascertain the mentality of adults, but it is generally agreed that a considerable proportion, ranging from 10 to 40 per cent of the adult inmates of jails, prisons and reformatories are feeble-minded.

Dr. Henry H. Goddard, director of the department of research of the Training School for Feeble-minded Children, at Vineland, New Jersey, who has made extensive studies along this line, says that every feeble-minded child is a potential criminal. The feeble-minded child becomes a criminal, not because of deliberate viciousness, but because he has not the mental capability or the will power to withstand the ordinary temptations of life, and because he is readily susceptible to the influence of vicious associates who make use of him to promote their own ends, and initiate him into criminal ways. Many crimes of violence are committed by persons of defective mentality, especially by the high-grade feeble-minded who have come to be known as "morons" who are easily excited or frightened, and who are not restrained by motives of conscience or prudence.

The studies of Goddard and other investigators have shown that the feeble-minded woman is twice as prolific as the normal woman, and that the large majority of feeble-minded children are the offspring of feeble-minded mothers. This arises partly from the fact that she is an object of pursuit and becomes the mother of illegitimate children and partly because she is not restrained by the ordinary consideration of prudence. If the feeble-minded woman consorts with the normal man there is more than an equal chance that the offspring will be defective; if she consorts with an inebriate or a syphilitic the probability of de-

fective offspring is greatly increased; if she consorts with a feeble-minded man her offspring is sure to be defective.

Under former social conditions a large part of the feeble-minded children died in infancy or early childhood; but with the gradual improvement in housing conditions, milk supply, and the general care of mothers and children among the poorer classes, together with the establishment of institutions for feeble-minded children, the lives of such children are preserved, and apparently their numbers are increasing more rapidly than the normal class. The number of feeble-minded children in the community is unknown. Indeed an exact definition of feeble-mindedness has not yet been established; but the estimates of the best qualified experts indicate not less than one feeble-minded person out of every 300 of the population, which would indicate a total of not less than 300,000 for the United States. Some experts estimate a much larger number.

Remedies.— Much attention is being given to the question as to how the multiplication of the feeble-minded can be checked. The most important propositions to this end are instruction of the public as to the danger of the marriage of the feeble-minded, marriage restriction laws, sterilization and segregation of the feeble-minded, especially young women of child-bearing age. Instruction is only a partial remedy because those who need it most are incapable of profiting by it. Marriage laws are a valuable but partial remedy for the reason that the feeble-minded multiply their kind regardless of marriage.

Sterilization has been decreed by the laws of 12 States but it is practically operative only in the State of California. The first State to adopt a sterilization law was Indiana, but the law has been inoperative there since 1911. A few operations have been performed in North Dakota, but the law is a dead letter in the remaining nine States which have adopted it.

Sterilization is a legitimate measure for the prevention of feeble-mindedness, but its efficacy is impaired in two ways: first, by the fact that all of the laws thus far enacted provide that the operation shall be performed only in cases where there is no reasonable prospect that the condition of the individual will improve. That provision protects the high grade feeble-minded, who are now recognized as the most prolific source of hereditary feeble-mindedness; second, by the fact that while public sentiment has quite readily sustained the enactment of sterilization laws, it has not sustained their execution. The indications are that only after a long time, if ever, will this difficulty be overcome by the education of the public.

Special Institutions.— Under these circumstances, segregation is being advocated, even by those who favor sterilization, as the most practical and available method of prevention. It is urged that special institutions be provided for all feeble-minded children who cannot be properly cared for in their own homes. Heretofore most of the institutions established have been «schools» for the care and instruction of young feeble-minded children. As the children have grown up, they have remained in the institutions, because there was no other place for them, but the care of adults was a secondary proposition, and the admission of adults was exceptional. Feeble-minded adults were cared for, if at all, by sending them to insane hospitals, reformatories or alms-houses, where they do not belong.

A few States, recognizing the importance of caring for adults, have established «colonies» for the care of the adult feeble-minded: for example, Massachusetts, New York, New Jersey and Minnesota. Other States, like Pennsylvania and Illinois are moving for similar institutions.

With the recognition of the facts of the heredity of feeble-mindedness, the rapid multiplication of this class of defectives, and the significance of feeble-mindedness as a factor in crime, there has come about an active movement in Massachusetts, New York, Michigan, Pennsylvania and other States for adequate custodial provision for the adults — at least for the young women of child-bearing age. The plan proposed is the establishment of colonies such as have already been established in New York, Massachusetts, New Jersey, Indiana, Minnesota and other States. The colony consists of a collection of buildings of a simple character, located upon a large farm. The colony is organized with a view to utilizing the labor of the inmates in such a way that they shall contribute as much as possible to their own support by the use of simple industries such as gardening, poultry, rug-weaving, basket-making and so forth for girls, and farming, redeeming waste land, care of stock, simple carpentry and so forth for boys.

In Massachusetts and New Jersey, wooden buildings are being erected of a very simple character, and the more intelligent inmates are used as caretakers for the low grade inmates, under careful supervision. The children receive such education as their natural endowments will warrant, but it is deemed useless to carry on expensive educational processes in the effort to develop that which is not in them.

By this system, the expense of maintenance is largely reduced without sacrificing either the happiness or the comfort of the inmates. These «children of a larger growth» find happiness in the performance of simple tasks together with simple forms of recreation such as folk-dancing, out-door games, calisthenics, moving pictures and so forth.

A large number of the adult feeble-minded are already under care in institutions which are not designed for them and are unsuitable for them: prisons, work-houses, reformatories, jails, almshouses and insane hospitals. In most of these institutions, the cost of their maintenance is much higher than in a colony for feeble-minded. This is especially true of girls in reformatories, where the cost of maintenance is nearly double what it would be in a properly organized colony. It would be for the advantage of all concerned if, instead of enlarging their reformatories, the different States would build separate institutions for the feeble-minded contingent in the reformatories.

It is generally recognized that provision for feeble-minded young women is more urgent than for feeble-minded young men for the reason that the feeble-minded woman is more prolific than the normal woman, and the feeble-minded man is much less likely to contribute to the increase of the defective population. The

number of feeble-minded persons in the United States is not known, but it is very large, probably there are not less than 250,000 of whom perhaps 75,000 are women of the child-bearing age, of whom less than 10,000 are as yet provided for in suitable institutions, leaving 65,000. Provision for this number is by no means impracticable. We are already caring for about 75,000 insane ones.

Epileptic Children.— Epilepsy is one of the most dreadful afflictions to which the human race is subject. The disease is obscure and to this day it is very imperfectly understood. The disease may begin at any age, and the early paroxysm is progressive and its progress is usually accompanied by a gradual decay of the mental faculties, taking the form of feeble-mindedness or insanity. There is no specific cure. All that can be done is to provide proper food, under medical advice, to provide congenial employment, suitable out-door exercise and recreation. Only a fraction of those afflicted recover — probably not more than 10 per cent.

The epileptic is peculiarly unfortunate because he is debarred from many of the ordinary pursuits of life. He cannot be employed on any vehicle. He cannot be a house painter, or a salesman, nor can he work safely about machinery. The disease often makes its victim morose or even dangerous. It is cruelty to both classes to incarcerate them in a hospital for the insane as is often done, or to keep them in an almshouse.

Ohio was the first State to establish a separate institution for epileptics. Several States have followed the example of Ohio. It should be generally adopted, both as a measure of humanity to a most unfortunate and most wretched class, and as a measure of protection to the rest of the community.

Crippled Children.— The first institution for crippled children was the New York Hospital for Ruptured and Crippled Children. It was established in 1863. In the 28 years from 1863 to 1890, only 5 institutions were established: 2 in New York city, and 3 in Philadelphia. In 1913, the Russell Sage Foundation found 35 institutions devoted to crippled children, including 9 orthopedic hospitals, 14 convalescent hospitals or homes and 12 asylum houses. Many general hospitals have orthopedic departments, and many other institutions receive and care for convalescent or chronic cripples. Many of these are designed especially for them. The cripples housed in institutions are remarkable for their courage, cheerfulness and optimism. They expect to get well and they endure their sufferings with a fine spirit of philosophy and hopefulness. This spirit is largely due to the influence of the orthopedic surgeons who have built up the beneficent institutions.

State hospital schools for crippled children have been established in Massachusetts, New York, Minnesota and Nebraska. These institutions are most important because they reach crippled children in rural districts who otherwise would never hear of an orthopedic surgeon. The care of crippled children is very expensive, but is highly economical because it makes productive children of many who otherwise would lead a miserable life of dependence. See CHILDREN, NEGLECTED; CHILDREN, DELINQUENT.

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HASTINGS H. HART,
Director Department of Child-Helping, Russell Sage Foundation.

CHILDREN, Delinquent. A delinquent child is one who commits an act which would be counted a crime, if performed by an adult. In most States of the United States, children who are declared incorrigible, knowingly associate with vicious persons or frequent vicious places, are classed as delinquents.

Up to the year 1823, juvenile criminals were tried in the criminal courts, associated with adult criminals, and received like punishment with them; but in that year, the New York House of Refuge was established. Children sentenced for crime were sent to the house of refuge, where they became the wards of the board of trustees, who were given authority to release them on parole when they gave evidence of reformation.

From this beginning grew up the juvenile reformatory system of the United States. Gradually the idea of punishment retreated into the background and the idea of guardianship, training and reformation came to the front. Sentences for fixed terms gave way to commitments for an indefinite period, to be determined in accordance with the child's progress in character and self-control.

In 1855 the Ohio State Reform School was built at Lancaster, on the cottage plan, without prison bolts, bars or walls. «Elder brothers» took the place of guards. The boys were treated as pupils rather than prisoners. From that time the cottage system gradually found favor until it is now in general use. The early cottages were built for 50 to 60 children each. The size of cottages has gradually decreased until cottages for 25 to 30 children are common. The Children's Village at Dobbs Ferry, N. Y., the State Agricultural School at Industry, N. Y., and the Thorn Hill school near Pittsburgh, Pa., have cottages for 20 children each, and the cottages recently built for the New York Training School at Yorktown Heights are designed for only 16 boys each.

In the most modern institutions for delinquent girls, each cottage is a complete domestic unit, with its own dining-room, kitchen and laundry. In some institutions, every girl has a separate room, while in others a part of the

girls sleep in dormitories, and the rest in single rooms. It is generally recognized that separate rooms should be provided for at least a part of the girls.

There has been a steady advance in the quality of employees in juvenile reformatories. Men and women of the highest character and attainments are now sought for superintendents because it is recognized that the task calls for a high degree of talent and training. In many reformatories, there has been a corresponding advance in the quality of subordinates, particularly cottage managers, and teachers of industries, and in the school of letters. In schools for delinquent boys, it is common to have a man and wife in each cottage, the wife serving as house-mother, and the husband being employed in the school or in the shop or on the farm and acting also as housefather. In schools for delinquent girls, each cottage has a house-mother and in some schools there is also a housekeeper or assistant. These house-mothers are now chosen with great care, with reference to their intelligence, refinement, devotion, patience and tact.

The school for girls at Sleighton Farm, Darling, Pa., employs for the most part, as caretakers, teachers and cottage mothers, young women who are college graduates. The Home School for Girls at Sauk Centre, Minn., prefers as cottage mothers mature women of intelligence and motherly spirit.

All managers of juvenile reformatories attach great importance to vocational education. Many reformatories have endeavored to provide instruction in tailoring, shoemaking, farming, sewing, dressmaking, cooking and other branches of housekeeping through the ordinary domestic tasks of the institution under instruction of ordinary employees. Experience has demonstrated that this method of instruction is ineffective, especially in large congregate institutions. In cottage institutions, with small groups, domestic science can be taught in the regular work of the cottages, but even under those conditions, special, trained teachers are needed to supplement such teaching. In boys' schools, special teachers must be employed for carpentry, blacksmithing, farming and so forth, in order to attain any practical success in vocational training.

Nearly all of the reformatories for boys are located on large farms; one acre for each boy is considered a suitable amount. The farm is used partly as a means of vocational training, partly for the wholesome effect of life on the land, even for boys who will go back to city life, and partly to supply an abundance of good milk and fruit and vegetables. It is doubtful whether these farms are profitable from a commercial point of view, but the other considerations undoubtedly justify the location of such institutions upon farms.

It is indispensable to success in the work of the juvenile reformatory that the children shall be trained for life, first by normal living, as much like that of a good family as possible, with the best possible instruction in mind, manners, morals and religion; second, by a well devised and rational plan of vocational instruction.

The work of the juvenile reformatory, always difficult, has been made doubly hard in recent years by two circumstances: First by the beneficent work of the juvenile court, with the probation system. Formerly the juvenile reformatory was the instrument of first aid, and many of its inmates were children guilty of minor offenses, who were readily impressed by the good influences of the industrial school. To-day the hopeful cases are placed on probation by the juvenile court. If they do not succeed, they may be placed on probation a second or a third time; and it is only after the probation system has proved ineffectual, that they are sent to a juvenile reformatory. The result is that children are committed from one to two years older than formerly, and are more familiar with evil and hardened by resistance to the restraining influences of home and Sunday school, day school and the juvenile court.

The second circumstance is the increasing proportion of defective children in the reformatories. The probation plan fails with many of them and while normal children are paroled and make good, these poor children, lacking the intelligence and the will power to withstand evil, fail on parole, and are sent back. These "defective delinquent" children need an entirely different discipline and training. They clog up the schools and hinder their proper work. They should be sent to separate institutions where they can be properly trained and cared for at a cost not more than two-thirds of that in a good reformatory.

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HASTINGS H. HART,
Director of Department of Child-Helping, Russell Sage Foundation.

CHILDREN, Dependent. A dependent child is one who is orphaned, homeless, or has no fit and responsible guardian to provide for his needs or, in general terms, one who "is dependent upon the public for support."

Strictly speaking, this definition would include the major part of the children who are commonly classed as "delinquent" or "defective"; but in practice delinquent and defective children, who are cared for as such, are omitted from the category of dependent children. The children recognized and recorded as dependent include children declared dependent by the juvenile court and other courts, children in orphanages and children's homes, normal children in almshouses, children placed in family homes by public authorities, and children placed in families by private orphan asylums, infant asylums and lying-in hospitals.

The question of the proper care of dependent children is one of the utmost importance, calling for the exercise of the highest wisdom, because it involves the permanent fate of the children who are in no manner responsible for their unfortunate condition and who are absolutely dependent for their welfare and prosperity upon the fidelity and wisdom of those assuming the responsibility of providing for them.

In former years it was a common thing for dependent children to be committed to the public almshouse, especially when the mother of the children was sent there; but it has long been understood that the almshouse was an absolutely unsuitable place for the care of any child, and in many States of the Union commitment of children beyond the age of one or two years is forbidden by law.

For a great many years, the favorite plan of caring for dependent children in the United States was the orphan asylum plan. By the orphan asylum plan is meant the bringing up children to young manhood and womanhood in orphan asylums. The argument was as follows: This child having been left homeless, a substitute should be provided for the home; and it was believed that a substitute could be provided which might be better than the original article. It was recognized and admitted that in many cases the child could not have a fair opportunity in his own home because his parents were vicious, incompetent or diseased, or for other reasons the child's own home was unfit. In the institution, however, it was believed that all of these difficulties could be overcome. In the institution it is possible to control absolutely the environment and conditions under which the child shall live. His food can be prescribed by a physician, and weighed out if necessary, and proper ventilation and cleanliness can be ensured. The institution can select the people who are to care for the child, direct his education in letters and in morals, his industrial and religious training. The child will never be tardy or absent from school, will never be on the street at night, will never miss his study hours. Under these favorable circumstances it would appear as if the institution might do far better for the child than even a reasonably good family home. Notwithstanding this plausible argument it has long been recognized, both by those who have had charge of institutions and those who have not, that institutional life is not the most desirable condition for a child, especially when continued for long periods. The reason for this view is *institutionalism*. Institutional life, even under the most favorable circumstances, is contrary to the nature of the child. The cooking is done by steam, the washing is done by steam, the house is heated by steam, the food is different in kind and quality, is cooked in larger quantities and by different methods than those which prevail in ordinary homes. The dining-room is arranged and ordered under a different plan. The entire arrangements are different from ordinary homes. The bell rings for the child to get up in the morning, to go to his meals, to play and return from play, to go to school and return from school; all day long the bell! That means that someone else is planning his life for him; someone else is doing his thinking for him; the child does not acquire initiative, independence or courage. He does not learn to spend money or to make a bargain for his services He does not learn to fend for himself in his dealings with his fellowmen.

In the best institutions for children efforts are made to overcome these difficulties by adopting the cottage system, with the children in small groups, providing a kitchen and dining-room for each cottage, creating as close as possible a relationship between the children and the superintendent; sending the children to other schools to mingle with other children; giving the children small wages to be expended under advice of older people, and so forth. Nevertheless, in the great majority of the institutions, these difficulties still exist.

In 1853 Mr. Charles Loring Brace, of New York city, organized the New York Children's Aid Society. He declared that for the greater part of the dependent children of the community institutional care is entirely unnecessary. He took children by the thousands from the streets and alleys of New York and sent them to farm and village homes to grow up in the normal life of the community. He maintained that the child placed in a good family home had better chances of success in life than a child brought up in an institution, even a good institution.

There arose a vigorous controversy between the advocates of the orphan asylum plan and the advocates of the child-placing system. This controversy was carried on in the National Conference of Charities and Correction for more than a quarter of a century, but it was finally closed in the brief, but admirable, report of the Hon. Thomas M. Mulry, a leading Catholic layman, chairman of the Committee on Neglected and Dependent Children. He said: "All workers agree that the home is the natural place to properly develop the child. . . . There is a growing tendency on the part of many of the poor to shirk the responsibility of the parents, and to transfer to others the duty which is strictly their own, to hand their children to the public care."

He said, referring to the report of Mrs. Elizabeth E. Williamson, chairman of the committee of 1898, "The good work accomplished by the institutions in the past was fully recognized, as well as the fact that the institution has an important place to fill in the future on the disciplinary and educational lines and the care of those children who are prevented by circumstances from being placed in homes. It was said that many children are kept longer than necessary in the institution, because, having no relatives, there were no persons to claim them; and such children it was thought might well be placed in good homes, provided the families were of the same religious faith as the child. The earlier they are placed in such families, the better it is for the child.

"The placing-out system needs the most careful supervision; and those interested in the work realize how prone to selfishness people are, and that many wish the children only for the work they can obtain from them. . . . This does not, however, mean that any effort should be spared to place as many children as possible in good homes; and this committee is strongly in favor of renewed activity in this direction. . . .

"Your committee is emphatically of the

opinion that the 'ounce of prevention is better than the pound of cure,' and it strongly urges upon all charitable people the absolute necessity of preserving the home wherever possible. . . . There are homes in abundance throughout our cities, our towns and our farming sections for every orphan child, if the people will but open their hearts and brighten their homes by studying in what way they may best show their love for their less fortunate fellow-beings."

This practically closed the debate as to the relative merits of the orphan asylum plan and the placing-out system. It recognized the legitimate work to be done by institutions, but urged the use of the family home plan to the utmost.

In January 1899 there was held in Washington, D. C., the celebrated White House Conference, which was called by President Theodore Roosevelt. The President invited about 200 delegates, representing every State in the Union, public officials and philanthropists, workers for children and the different religious organizations. This conference, after a full discussion, adopted a platform which contained the following statements: "Home life is the highest and finest product of civilization. . . . Children should not be deprived of it except for urgent and compelling reasons. Children of parents of worthy character suffering from temporary misfortune, and children of reasonably efficient and deserving mothers who are without the support of the normal breadwinner, should, as a rule, be kept with their parents, such aid being given as may be necessary to maintain suitable homes for the rearing of the children. . . .

"As to the children who for sufficient reasons must be removed from their own homes, or who have no homes, it is desirable that, if normal in mind and body and not requiring special training, they should be cared for in families whenever practicable. The carefully selected foster home is for the normal child the best substitute for the natural home. Such homes should be selected by a most careful process of investigation, carried on by skilled agents through personal investigation, and with due regard to the religious faith of the child. After children are placed in homes, adequate visitation, with careful consideration of the physical, mental, moral, and spiritual training and development of each child on the part of the responsible home-finding agency is essential."

This platform was adopted by a conference composed of representative philanthropists, including trustees and officials of charity organizations, juvenile reformatories, orphanages, children's homes, children's aid societies, children's home societies, societies for the prevention of cruelty to children and so forth. It was adopted unanimously without a single dissenting vote.

There is still a difference of opinion as to the question how far and in what cases institutional treatment of dependent children may be necessary; but there is practical unanimity of opinion that the family home is the best place for dependent children, and the placing-out method is increasing in favor, and in some States there is even a marked decrease in the relative number of inmates of orphanages and children's homes, as is indicated by the returns of the census.

Take, for instance, the States of Massachusetts and Indiana. In the State of Massachusetts the census of 1904 showed 129 in orphanages and children's homes out of each 100,000, but in 1910 it showed only 121. In 1904 the State of Indiana showed 110 inmates of orphanages and asylums for each 100,000, but in 1910 it showed only 96. In the State of Massachusetts at least 15 institutions for dependent children have been closed and have gone out of business. In both of these cases there has been a corresponding advance in the number of children placed in family homes. The different organizations in the State of Massachusetts have under their supervision at least 10,000 children placed out in family homes.

There is a gradual advance in the standards of institutions for dependent children: First, as to the quality of the superintendent and other employees. A higher degree of education, training and general fitness is demanded than formerly. Second, as to the education and training of the children. Many institutions, especially those in cities, send their children to the public schools, where their progress usually compares well with the children of the rest of the population. The best of the institutions which maintain their own schools, demand of their teachers equal qualifications with those in the public schools, and seem to give their children equal advantages. In small institutions it is of course necessary to have two or more grades in charge of a single teacher. Third, in the personal care and training of the children. Orphan asylum children are better clad and better fed than formerly, which means that attention is given to their medical treatment, and the care of their teeth, eyes, skin and so forth. In the best institutions, dietitians are employed, and the effort is made to secure an adequate and balanced ration, carefully prepared.

The Placing-out System.— Placing-out is defined by the law of the State of New York as "The placing of a destitute child in a family, other than that of a relative within the second degree, for the purpose of providing a home for such a child." Placing-out implies that a parent, guardian or a court which has legal control of the child selects a home, places the child in it by virtue of that authority and continues to be responsible for the supervision of the child in order to insure his proper treatment by the foster parents.

While the orphan asylum plan is the prevailing one in a few important States, including New York, Pennsylvania, California, Maryland and Connecticut, the placing-out method is the prevailing one in many States, including Massachusetts, Illinois, Michigan, Iowa and Minnesota. It is estimated that not less than 10,000 Massachusetts children are under supervision in family homes where they have been placed-out.

Children may be placed-out in "free homes," without paying their board and with or without legal adoption; or they may be placed in "boarding homes," where board is paid, either from the public treasury, or from the treasury of some benevolent institution or society or, in whole or in part, by the parents of the child. When board is paid the amount is usually below the ordinary rates of board, ranging from $2.50 to $3.50 per week for a healthy child, to $5 or $6 per week for a sick child. Or a child may

be placed-out at wages agreed upon between the placing-out agency and the employer; usually with the proviso that a portion of the wages shall be placed at interest for the subsequent use of the child.

Formerly the practice prevailed widely of placing-out children on an indenture contract, under which the foster parent assumed certain obligations as to food, clothing, medical care, schooling and religious privileges, agreeing further to pay a stipulated sum to the child on the expiration of the contract, provided the child had stayed out his time. It is now quite generally agreed that the indenture plan is undesirable and that the placing-out agency should reserve the right to remove the child whenever in their judgment it may be for its interest. Where the indenture plan is continued the indenture usually contains a provision under which the child may be removed at the discretion of the placing-out agency. In Indiana and some other States, the law requires that indenture contracts shall reserve this right.

Placing-out is an exceedingly technical, difficult and responsible undertaking. It requires agents of training, experience and conscience. The placing-out method has been justly discredited in many communities for lack of these qualities. It has been undertaken by many irresponsible people: keepers of baby farms, matrons of lying-in hospitals, poormasters and other people whose chief object has been to dispose of the child with the greatest speed and the least possible trouble and expense.

There is an active demand for the older boys and girls by people who wish to save the expense of hiring servants. Even well-meaning people often err thoughtlessly by expecting and exacting too much from such a child. Only the unceasing vigilance of a faithful and tactful agent can protect the child against the comparative danger of overwork, deprivation of school privileges and financial injustice.

The following is an outline of the essential standards required in order to carry out properly the placing-out system:

1. A careful case study of the family history, home conditions, character and capability of parents, responsible relatives, physical condition, mental condition of the child and also, in the case of older children, their capabilities and aspirations.

2. A determination of the question whether the child is a proper subject for placing-out, taking into account his mentality, his physical condition, the probability of the rehabilitation of his home and the question of the responsibility of grandparents, older brothers and sisters and other relatives. If it is proposed to sever the parental relations permanently, and especially if it is proposed to place the child for adoption, this question should be determined by a court of record. If the child is to be boarded out, or placed under such conditions that he may be readily recalled at any time, the question may be determined by a responsible public officer, a competent superintendent of an institution, or a competent agent of a philanthropic society.

3. The preparation of the child for his foster home by medical treatment, surgical treatment, physical care, training in manners and so forth. Under skilful direction, these preparations can usually be accomplished in a few weeks. It often makes a great difference as to the quality of the home secured and the whole future prospects of the child. Most agencies undertake to do this work in a properly equipped "receiving home"; but some agencies, for example, the children's aid societies in Boston and Baltimore, prefer to use private families, even for this work. The New England Home for Little Wanderers has recently established in Boston a complete and thoroughly equipped laboratory for the physical, medical and psychological examination of children and for securing whatever treatment may be necessary to put them in the best possible condition.

4. The inspection and study of foster homes offered for dependent children in order to determine, first, whether the home is a desirable one, and second, what kind of child should be selected for this particular home. The study of prospective homes requires experience and good judgment. The amateur will often approve a home which would be instantly rejected by an experienced agent. This study involves the intelligence, character, spirit, disposition and financial ability of the inmates; the comfort, refinement and atmosphere of the home, the character of the neighborhood and the community, the opportunities of school, church and social life and many other important elements. The foster homes which prove to be the most satisfactory are usually those of people of moderate means, good character, cheerful dispositions and genuine purpose to help a needy child.

5. The fitting of the child to the home. This is the most critical point in child-placing. You may have a good child and a good home but they may not be adapted to each other. The proposed foster parents often make a mistake in their selection from lack of experience. They need the guidance and help of a trained adviser.

6. The supervision of the placed-out child. When an organization has taken the responsibility of selecting a home and placing the child in it, when the child is incapable of exercising any choice, it thereby incurs a sacred obligation to see to it that the child does not suffer for lack of friendly watch care, and it must employ responsible agents who can be depended upon to exercise both judgment and courage. The obligation is too sacred and the responsibility is too great to depend upon volunteers, no matter how willing or faithful they may be. The volunteer is liable to be influenced insensibly by local or personal consideration, and the volunteer cannot be held to the same accountability as a trained and paid agent.

7. Supervision by the State. It is now recognized that the great mother State is under obligation to exercise fostering care over all dependent and neglected children, whether in or out of institutions for children. It has long been the practice, in case an orphan child is heir to any property, to appoint a guardian, who shall conserve the sacred property rights of the child; but if the orphan child had no property and only his body and soul needed looking after, it was not deemed necessary to appoint a guardian, because there did not seem to be any sacred rights to be conserved. It is beginning to be recognized that the child who has no property is all the more in need of a responsible

guardian, and gradually the State is beginning to assume the responsibility for all dependent children. New Jersey has a State board of children's guardians which is responsible for all children who are public wards. The District of Columbia has a similar board of guardians. In Massachusetts, Ohio, Indiana and California the State boards of charities are made responsible for the supervision of placed-out children. In Iowa the State board of control and in Illinois the State board of administration performs this duty.

The powers and duties of the State agencies vary in different States in their powers and duties, but in general they inspect and report upon the work of public and private institutions and societies which receive public money or receive children through the courts; they receive reports as to children placed out by public and private agencies and have authority to visit such children and to require their removal from foster homes, if necessary.

In New York, Kentucky and Idaho certain private societies have a degree of supervision over children who are cared for by other charitable institutions. In many States the juvenile court has authority to inspect and supervise institutions to which it commits children and to refuse to commit to institutions which do not maintain satisfactory standards.

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HASTINGS H. HART.
Director Department of Child-Helping, Russell Sage Foundation.

CHILDREN, Diseases of. Children's diseases may be, at the outset, roughly divided into three groups: (1) Diseases which are common to both adults and infants; (2) weaknesses and diseases inherited directly from the parents; (3) diseases peculiar to the various epochs of life from infancy to adolescence.

Antenatal Disease.— To begin with, disease or deformity may attack the child before it is born, i.e., the fetus *in utero*. A pregnant woman who is suffering from any one of a great number of infectious diseases, such as smallpox, scarlet fever, measles, erysipelas, typhoid fever, cholera, malaria, syphilis, or tuberculosis may directly infect the child in the womb. For instance, typhoid during pregnancy nearly always affects the fetus so that it either dies *in utero* and is expelled prematurely, or else it is born at full term suffering from the disease. In the latter case, the disease manifestation is usually a general typhoid septicemia, i.e., the blood is swarming with active typhoid bacilli, though as a rule the intestinal ulcers commonly present in adults and older children are absent.

Diseases of the bone or errors of bone development may manifest themselves during the life of the fetus. The effects of such diseases are seen in babies who are born with congenital rickets, or with a defect or absence of a portion of the spinal column; a condition known as spina bifida, in which the spinal cord and its coverings are exposed to the naked eye. A baby may be born with a very large head, due to the accumulation of excessive fluid in the ventricles of the brain. This condition is known as hydrocephalus. Indeed the head of the fetus may attain such a large size that in some instances it has to be punctured in order to render birth possible.

Nearly every organ of the body is subject to malformation or error of development before birth. Defective closure of the normal bony structures leads to certain malformations, such as harelip, clept palate and hernia of the brain and its coverings. Defects in the abdominal wall sometimes lead to a hernia in which the liver and intestines may be exposed to view. An incomplete development of the bladder may result in a condition known as ectopia vesicae, characterized by a deficiency in the abdominal wall as well as the anterior wall of the bladder, whereby the mucous membrane of the bladder becomes exposed.

Malformation of the heart is common in these antenatal diseases. In some instances, however, where there is inflammation of valves or muscles, the disease may possibly be acquired as a direct infection from the mother, instead of constituting an error of development.

There are malformations of the extremities, such as webbed fingers or webbed toes and club feet. There are deformities about the genitalia, such as undescended testicles, imperforate hymen and hermaphroditism. There are congenital dislocations of the joints, curvature of the spine, imperforate anus, hypertrophic stenosis of the pyloris and occlusion of the æsophagus. Indeed, one can hardly think of any organ of the body without considering some congenital malformation or some arrest in development which may be found in any museum of anatomy or pathology.

Accidents and Injuries Resulting from the Act of Birth.— The life and health of the human individual is not only in jeopardy before birth, but is menaced in certain ways during the act of birth itself. A long, difficult labor, instrumental delivery, a rigid birth canal which delays the expulsion of the baby's head and subjects it to great pressure may in some instances result in such injury to the skull or its contents as fracture, hemorrhage into the coverings of the brain, or meningeal hemorrhage, which may in turn ultimately bring about paralysis, idiocy or convulsions.

The extremities may also be injured during birth. Fractures of the long bones may occur as an unavoidable accident in difficult labors.

Diseases of the First Days of Life.— A newly born baby presents certain phenomena, which occurring in later life would be considered pathological, but which in the infant we speak of as physiological. The most striking example of these is the jaundice which appears from the first to the sixth day of life and disappears ordinarily in a week or two without causing any disturbance of health. Of course, in this connection we do not include those cases of congenital obstruction of the bile duct, inflammatory disease of the liver, and septic infections, where jaundice may indicate a

severe, if not a fatal disease. Another physiological phenomenon of the early days of life is the desquamation of the outer layers of skin which happens to nearly every new born baby. Ordinarily, this occurrence is of no serious consequence, but when the desquamation is excessive, it partakes of the nature of disease. Albumin is frequently present in the urine of newly born children, but disappears soon, and as a rule, has no pathological significance.

Newly born babies become easily infected. The infection may occur through the open umbilical wound, through the broken external integument, or through any mucous surface. Almost any of the known micro-organisms, such as the pus organisms, the pneumococcus, or the tetanus bacillus may cause infection. In the newly born baby these infections rapidly tend to become generalized. For instance, the infection which enters the body through the navel shows a striking tendency to gain access to the circulating blood and produces symptoms of general septicemia, with abscess formations in remote parts of the body, high fever and great prostration. In the majority of such cases, death ensues. It is obvious that the same antiseptic and aseptic precautions which are employed with reference to the mother should also be employed in the care of the baby.

Another disease manifestation, probably due to pus organisms, which is spoken of as pemphigus of the new born, is characterized by the formation of multiple bullæ or blisters occurring on the trunk and the extremities. This variety of pemphigus must be differentiated from the syphilitic variety, which is localized usually on the palms and the soles and is associated with other syphilitic manifestations.

The eyes of newly born babies are particularly susceptible to infection. This usually involves the mucous membrane which lines the lid and covers the eyeball. The milder cases are caused by a simple pus infection, the organism being contained in the vaginal secretions of the mother. The severer infections are usually due to the organism of gonorrhea and results in gonorrheal ophthalmia, a very dreaded disease of the newly born. Though the infection may be caused by filth contamination from without, it usually results from the presence of the disease in the mother. In the child it runs a severe course, resulting frequently in the permanent loss of vision. It has been estimated that from 25 per cent to 30 per cent of blindness in adults is caused by gonorrheal ophthalmia. The disease, however, can be prevented in the new born baby by the use of the Credé method of prophylaxis, which consists of dropping one or two drops of 1 per cent nitrate of silver solution into the baby's eyes immediately after birth.

Resistance to Disease in Infancy.— The healthy baby, as soon as he becomes a bona-fide member of society, is a happy mortal. During the early part of his life, he sleeps almost continuously, awakening only to get his food. He gains steadily in weight and has a normal temperature. He has a fresh pink skin that is full and elastic to the touch. Such a baby is uncomplaining. He has a keen appetite, normal evacuations from the bowels and kidneys, and is not irritable, cross or whining. Being, however, a delicate and undeveloped organism, he must be carefully protected against disease, particularly against septic infections, to which the newly born or young infant is easily predisposed. This is due in part to the fact that his skin and mucous membrane are delicate in texture and can easily be broken, and in part to the fact that, compared with older children and adults, he has a diminished power to develop antibodies which will resist invading microbes or their products. His predisposition to disease, moreover, is influenced by another factor, i.e., food. The normal food of the young infant is breast milk. Breast fed children not only thrive better than artificially fed children, but they also show a greater resistance to infection, have an increased immunity to disease, and develop higher bacteriolytic power in the blood. Clinical observation has repeatedly shown that breast fed children not only have a greater relative immunity against such acute contagious diseases as scarlet fever, measles and diphtheria, but that when they are stricken by these diseases, the course is less severe and less likely to be fatal than in artificially fed babies.

Digestive Disturbances.— Nevertheless, breast fed as well as artificially fed babies may suffer from alimentary disturbances. In the former, the principal causes of disorder are two: underfeeding and overfeeding. Underfeeding is due usually to the inability of the mother to secrete a sufficient amount of breast milk, though at times it occurs where weak babies have insufficient strength to suck the milk from the mother's breast. The result is that the baby loses in weight, tends to become emaciated, frequently has a subnormal temperature, and if the inanition be long continued, he becomes drowsy and apathetic. He may be constipated, though at times he has diarrhœa.

In every case where underfeeding is suspected, one should weigh the baby before and after feeding, in order to discover the amount of milk ingested. If this amount is inadequate, the breast feeding should be supplemented by a suitably prepared artificial food, or if the baby is very weak and suffering from poor digestion, he should be supplied with the milk of a wet nurse. The various remedies for increasing the quantity of a mother's milk, such as food, medicine or alcoholic drinks, are usually ineffectual. The best stimulant for the flow of breast milk is the sucking of the infant. Every mother, therefore, should persevere by putting the baby to the breast at regular intervals and encouraging him to suck.

Overfeeding at the breast also leads to digestive disturbances. Although a baby will tolerate overfeeding with breast milk for a long time, he eventually suffers. He becomes restless, cries at night, and vomits occasionally. He not only fails to gain in weight, but may actually lose. His abdomen becomes distended. He has symptoms of flatulence and colic, and frequent loose and green stools. The treatment for this condition is simple, particularly when it is recognized early. If the milk is flowing too freely, the baby should be fed not oftener than at four-hour intervals and be allowed to remain at the maternal breast no longer than twenty minutes at a time. In the more severe cases, breast feeding should be discontinued for 12 to 24 hours, and a bland, non-irritating diet substituted, such as water or weak tea sweetened with saccharine.

Constipation occurs in both breast-fed and artificially-fed babies. It is sometimes due to excess of fat in the diet and sometimes to a deficiency of sugar. Such disproportion should, therefore, be immediately corrected. On the other hand, it may be due to a congenital dilatation of the rectum and colon or, not infrequently, to an inactivity of the sphincter muscles of the bowel. In the latter case, slight assistance with a suppository or an enema of sterile water, given with a small hand syringe is all that is required. Emphasis should be laid on the fact that the frequent administration of cathartic drugs is not only unnecessary but is actually harmful. The diseases caused by artificial feeding may produce a variety of symptoms: viz., local disorders of the gastro-intestinal tract, such as vomiting and diarrhœa; and marked constitutional disturbances, such as failure to gain in weight, restlessness on the one hand, or drowsiness approaching coma on the other, with disturbances of breathing, heart action, blood content, and urinary elimination.

We were formerly taught that alimentary diseases in artificially-fed babies were caused by infected milk conveying certain bacteria into the intestinal tract. While contaminated milk undoubtedly causes considerable disease, the majority of alimentary disorders is caused by the ingestion of foods for which the baby has no tolerance. These foods, failing to assimilate properly, produce toxic products in the intestines, in the circulating fluids of the body, or possibly in tissues and organs. As a consequence, babies fail to gain in weight and show, not only alimentary, but also constitutional disorders. The basic problem in artificial feeding, then, is to ascertain which of the elemental food stuffs produces toxic disturbances. This subject has been investigated thoroughly in recent years. We now believe that fat and sugar may produce certain well known alimentary disturbances and should not be given in excess. The prevailing view as to the cause of these food disorders is that they are due to bacterial decomposition of the food, either inside or outside of the intestinal tract, creating poisonous products which produce the disease manifestations. The foods which are thus acted upon and decomposed are the carbohydrates and the fat contained in the milk. Through the action of the bacteria, these undergo a process of fermentation which results in the production of fatty acids. The acids produced by the fermentation of an excessive quantity of sugar cause increased peristalsis, diarrhœa, and other symptoms of disease; while those produced by an excessive quantity of fat may combine with the alkalis to form soaps. In the latter instance, the body becomes deprived of the mineral substances required to neutralize the normal acids of the body, so that very soon there is an excess of acids in the intestines and fluids of the body and we have the condition known as acidosis. It is not to be understood from this theory, which relates to the disturbances produced by food, that infections, as such, cannot take place in the intestine. In fact, it is commonly recognized that infectious diarrhœas may occur as the result of action of specific or non-specific bacteria on the intestinal mucosa.

Alimentary disturbances may also occur as the result of infections in parts of the body outside of the intestinal tract. Thus, a baby with pneumonia or grippe has a diminished tolerance for food, and vomiting, diarrhœa, loss in weight, and high fever may occur. These cases differ from the purely alimentary type in that the fever and other symptoms continue even when the food is withdrawn or modified in such a way as to prevent intestinal fermentation.

To summarize and to supplement very briefly treatment of the alimentary disturbances in infancy, the following points should be emphasized: (1) Every newly born and young infant is entitled to receive its natural food, breast milk. (2) Overfeeding is to be avoided. It is as disastrous as underfeeding or starvation. (3) An excess of fat or sugar is capable of producing general toxic symptoms. (4) Simple milk mixtures, i.e., milk, diluted with plain water or with cereal water, with the addition of 3 to 5 per cent of sugar will in most cases give satisfactory results. Normal infants require daily a quantity of milk equal to one-tenth of the body weight. After the fifth month of the baby's life, he should receive one and one-half ounces of milk for every pound of his weight exclusive of the sugar and starch added. (5) The technique of successful feeding consists in the careful preparation and proper administration of the food. This precaution is also an important disease preventive. (6) In feeding sick infants it is frequently possible upon careful and intelligent inquiry, to ascertain which food element in the milk mixture is producing harm. Thus the proper modification may be made. (7) In some children, cow's milk produces toxic symptoms. Attempt should therefore be made in such cases to administer breast milk, skim milk, or some adaptation of cow's milk which is low in fats and sugars. Every baby, especially if he is sick, is a law unto himself, and should be studied as an individual. No one's dictum or rule of thumb or recent discovery is ever as important in solving the feeding problem as a knowledge of the general principles of food and digestion. (8) Prolonged starvation lowers resistance and predisposes to disease and death. (9) Prolonged and excessive use of laxative drugs is harmful, since it irritates the delicate mucous membrane of stomach and bowel. The indiscriminate practice of giving laxatives is based on tradition, not upon a knowledge of facts. Their use does not, as a rule, improve or cure the alimentary disease or assist in digestion or assimilation of food. (10) Scalded or boiled milk may be used when raw milk causes indigestion and diarrhœa. (11) Sometimes an infant's feeding difficulties or his alimentary disturbance may be due to an inherited or infectious disease, an anatomical malformation, or a constitutional vice.

The Respiratory Diseases.— Second in frequency to the diseases of the alimentary tract are the respiratory disturbances. Their most frequent manifestations in infancy and young childhood is the common cold, or as it is sometimes called, la grippe. This disease may occur either epidemically or endemically. It is frequently carried by nurses, parents or anyone suffering from a cold. The babies whom it affects suffer from catarrhal inflammation of the throat, nasal mucous membranes, larynx, trachea and bronchial tubes. At times, they

are restless and at other times, somnolent. They frequently present gastro-intestinal symptoms, such as vomiting, diminished tolerance for food and loss in weight. These symptoms, however, are present without any intestinal lesions. La grippe is frequently complicated by more severe respiratory diseases, such as bronchopneumonia, middle ear infection, kidney infection, meningitis, valvular heart disease, peritonitis and sometimes pyelitis, i. e., a disease in the pelvis of the kidney which is manifested by a large quantity of pus in the urine.

The most important factor in the treatment of grippal disorders consists in their prevention. The baby should be protected from other children and adults who are suffering with catarrhal symptoms. He should be fed and cared for in such a way that his resistance to disease shall be maximal. He should be properly clothed and kept in well ventilated apartments or out of doors, when the weather permits. If he falls ill, he should be loosely clad and kept in a well ventilated moderately warm room. Physical and mental overstimulation of every kind should be avoided. Nourishment should be continued if the patient is able to take it. The baby should not be depleted by the excessive use of laxatives. Drugs should be administered only when they are indicated or advised by the medical attendant.

Bronchitis, which is of frequent occurrence in young infants and children, develops usually in association with many of the acute infectious diseases, notably with measles and whooping cough. It gives rise to very definite signs and symptoms, the most prominent of these being cough, fever, and the so-called rales, which, on examination, are heard diffusely distributed over the lungs. When bronchitis confines itself to the larger bronchi, it is rarely ever severe. When, however, the pathological process extends into the smaller bronchi, producing inflammation in the bronchioles, it develops into capillary bronchitis, one of the forms of bronchopneumonia.

Although bronchopneumonia may occur as a primary disease, it is, as a rule, either secondary to grippal infections or to bronchitis, or it occurs concomitantly with the acute infectious diseases which have already been mentioned. It is a disease peculiar to the extremes of life, occurring most frequently in infants and the aged. In infancy it may occur in feeble children, in those who are prostrated, either by malnutrition or by a previous disease. It is characterized by a gradual onset, usually of fever, which in very delicate or feeble children may be moderate or absent, followed by high fever, rapid breathing, cyanosis or blueness of the skin and visible mucous membranes, rapid pulse, short hacking cough, and usually great prostration. In some of the severe cases there occurs a retraction of the soft parts of the thorax, such as the intercostal spaces and the muscular attachments at the lower end of the sternum. Bronchopneumonia produces the highest mortality in those children who have been debilitated by previous disease.

There is not, as yet, any specific remedy for bronchopneumonia. The present treatment is symptomatic. The best hygienic condition should be provided for the sick infant. The sick room should be ventilated; pure fresh air should be provided for. The nutrition should be maintained. Stimulants should be employed when needed. Depleting medication of every kind should be avoided. Unnecessary manipulation of the child, including excessive bathing and handling, should not be permitted.

Lobar pneumonia, which is the most frequent type in adults, may occur at any age and affect previously healthy children. The onset is usually sudden. The disease begins with vomiting, sometimes with rigor or convulsions. The face is flushed, fever is high, and respirations are rapid. The patient is prostrated almost at once. He complains of headache and general weakness, and refuses food. The pulse is usually rapid. Very often the patients show marked nervous symptoms. Sometimes convulsions occur early in the disease. Delirium is not uncommon. While the base of the left lung is the most frequent location of the disease, any portion of the organ may be involved. In some instances, both lungs may be attacked. There are four successive stages: Congestion, red hepatization, gray hepatization, and resolution. In red hepatization, the air cells are filled with fibrin and red and white blood cells, the red predominating. In the gray stage, the white predominate. In favorable cases, resolution begins in about a week or 10 days. Occasionally a resolution is delayed, so that the temperature falls gradually instead of critically.

Pleurisy is the most frequent complication. This disease sometimes takes the purulent form, which is also called empyema. This complication protracts the fever and causes embarrassment of respiration. The patient suffers profuse perspiration, irregular temperature, circulatory embarrassment, and emaciation.

Pericarditis, endocarditis, meningitis, and middle ear diseases are occasional complications. It is a noteworthy fact that notwithstanding the severity of lobar pneumonia, the mortality is not high, usually 3 to 4 per cent.

The treatment of lobar pneumonia, like bronchopneumonia, should be conducted along the lines of hygiene. The patient should lie comfortably in a well ventilated room. Cool or tepid sponging may be employed for the temperature. Pain should be relieved by sedatives. Excessive medication should be avoided, and stimulants should be employed only when cardiac failure is threatened.

The Nervous Diseases of Children.— The nervous system is incompletely developed at birth, so that its functions are easily disturbed during the first years of life. Thus young children are more easily predisposed to nervous disorders than adults. There are certain nervous diseases that are peculiar to infancy and childhood, due either to abnormal development at birth or to hereditary influences. As an example of abnormality, may be cited the baby born with a congenitally small head and brain, constituting a condition known as microcephalus, and the baby born with a large head and a large brain, hydrocephalus. And as an example of inherited nervous disease developing shortly after birth, we have the cerebellar ataxia.

Those children who are born with a deficient thyroid gland, and those in whom it degenerates shortly after birth, suffer from myxedema, a condition of idiocy also known as cretinism. Such children are usually dwarf-

ish, with thick lips, thick tongue, depressed nose, coarse hair, and coarse skin. They usually present a protuberant abdomen and umbilical hernia. They develop slowly, both physically and mentally, and suffer from more or less permanent mental impairment. The majority of them are benefited by the internal use of thyroid gland extract in appropriate doses.

Mongolism is a condition akin to cretinism, except that it does not depend upon alteration in the function of the thyroid gland and does not yield to thyroid treatment. The mongols are undersized, have a peculiar obliquity of the eyelids, and small, somewhat flattened skulls. Like the cretins, they are slow in mental and physical development. While they are usually kind and affectionate and in most instances learn to talk about the fourth or fifth year, they nevertheless remain always subnormal and can be educated only to a limited degree.

Infants frequently sustain injury to the head during the act of birth, as the result of which they are apt to have meningeal hemorrhage and destruction of meninges and brain tissues. Important brain cells are separated from their nerve connections following such tissue destruction, so that the nerve fibres which have their origin in these cells undergo degeneration. This condition explains the numerous cases of paralysis, convulsions and idiocy which result from head injuries at birth.

Infants are predisposed to convulsions, which occur under a variety of conditions and have their origin in various ways. They may be primarily central, i. e., their source lies in affections of the brain itself, such as inflammation of the brain (encephalitis), inflammation of the brain coverings (meningitis), abscess of the brain, hemorrhage into the brain, and brain tumors. Another class of convulsions is due to toxic conditions, resulting, for example, from the use of such drugs as strychnia, etc., from bacterial poisons, such as are produced by tetanus and hydrophobia; or from toxic processes produced by perverted chemical products in the body, such as uremia, which occurs in diseases of the kidneys, or the poison produced by diabetes. Eclamptic attacks sometimes occur as the result of toxic products in the gastro-intestinal tract arising from severe alimentary disturbances. Similarly when the body is overpowered by the toxic products of an acute infectious disease, such as pneumonia or scarlet fever, convulsions not infrequently occur at the onset. Burns of the external integument, if very severe, frequently cause convulsions. The explanation in this case is also to be sought in the production of poisonous products by the action of the burn on the injured tissues.

Tetany or spasmophilia may assert itself in the form of active convulsions. The disease condition depends upon an excessive irritability of the nervous system and is usually due to faulty nutrition. In addition to convulsive attacks, spasm of the larynx may be present or spasms of the hands and feet, the so-called carpo-pedal spasm. Many of the convulsions of the first years of life arise in this way. Spasmophilia is usually associated with rickets.

Epilepsy, a diseased state characterized by convulsions, may occur at any period of childhood. As a rule, it depends upon fine structural changes in the nerve cells of the central nervous system. In early infancy it is sometimes difficult to differentiate recurrent convulsions from true epilepsy.

Although most of the nervous diseases of adult life occur among children, there are a number which are peculiar to infancy. Among these may be mentioned amaurotic family idiocy, an inherited disease characterized by blindness, progressive mental deficiency, and paralytic symptoms; myatonia congenita, infantile cerebral palsies, the muscular atrophies, and nodding spasm. Infantile spinal paralysis may be included in this list, for although it may occur at any age, it is much more frequent in infancy and young childhood than in later life.

Diseases of Nutrition.— The most frequent disease manifestation occurring as a result of improper nutrition is rickets or rachitis, a disease affecting the bones which occurs most commonly in artificially fed children. The early symptoms are characterized by restlessness, possibly pain, sweating, and pallor of the skin and mucous membranes. The bones, being deficient in mineral matter, are soft. The skull bones are parchment-like, and when pressed upon, instead of being firm, they crackle and are easily depressed. When the earlier florid stage disappears, it is noted that the head is large, that the bones of the skull are thickened, and that the junction of the bony with the cartilaginous portion of the ribs is marked by bead-like nodes, which constitute the so-called rachitic rosary. The chest is frequently deformed; the abdomen is enlarged and protuberant. In these children, normal development, such as learning to walk and dentition, is delayed.

In many of the rachitic children, every vestige of the disease disappears in later childhood. In a certain number, however, where the deformities have been severe, they may remain permanent unless relieved by surgical treatment. The treatment of rickets is essentially one of proper hygiene and food. Somewhat older children may be given fresh fruit, vegetables, animal broth, and, if advised by a physician, minute doses of phosphorus, 1/200th of a grain, given internally two or three times a day.

Infantile scurvy, another nutritional disorder, is due to errors of diet, such as, for example, absence of fresh food. The disease as it occurs in young infancy, is characterized by hemorrhage under the periosteum of the bone and sometimes by hemorrhages from the mucous membrane into the muscular structures and under the skin. Scurvy manifests itself by fretfulness, swelling of affected arms or legs, so that they are painful when moved, and swollen and spongy gums which bleed readily. The disease is sometimes mistaken for rheumatism. If it is detected early, it yields readily to treatment. In fact there is no more striking phenomenon in treatment of disease than the rapidity with which these cases recover when given daily doses of orange juice.

The Fevers of Infancy and Childhood.— Fever forms as important and prominent a symptom in the diseases of infancy as it does at any later stage of life. The new-born baby frequently shows a febrile reaction during the first hours or days of life. This, in some

cases, is due to the retention of urinary products which have failed to be eliminated. In other cases it may be due to infections to which new born babies are prone and which may result in a more or less generalized sepsis. It is a matter of common knowledge that infants and young children show a relatively higher temperatures than adults. In pneumonia, for example, it is common for a child to have a temperature ranging from 105 to 106 or 107 degrees, and yet recover. Most of the acute infectious diseases, active tuberculosis and the eruptive diseases, such as scarlatina and measles, are accompanied by high temperature reaction; though in uncomplicated diphtheria or whooping cough it may be moderate or low. Fever frequently occurs in intestinal disorders as the result either of food disturbances or infection. It occurs often in infections of the nose and throat. In some children, the temperature elevations are always higher than in others of the same age or weight. This difference is a matter of individuality and is dependent upon the nervous constitution and in some instances upon the strength and general resistance of the child to infection.

The cause of fever in infancy and childhood is often obscure. Sometimes it may be protracted for weeks without offering any indication of its origin. If, after a careful examination of visible mucous membranes, the heart, lungs, abdomen and skin, no adequate explanation is found, the examination should be continued further. Not infrequently, high fever is caused by disease of the middle ear, which may result eventually in abscess. Consequently, in every instance of obscure fever, the ear should be examined by an expert. Occasionally in female children (rarely in males), fever is caused by urinary infection. This condition, which is spoken of as pyelitis, is caused by a disease process in the pelvis of the kidneys and may last with a high temperature for days or weeks. One of its most prominent symptoms is the presence of a large quantity of pus in an acid urine. In the vast majority of such cases, the infection is due to the colon bacillus, which has taken on a pathological activity. The normal habitat of this organism is the bowel, where it is, as a rule, harmless, and plays, probably, a physiological rôle in normal digestion.

Naso-pharyngeal disease and chronic inflammation of the tonsils with enlarged cervical glands is not an infrequent cause of protracted fever, and its persistence is an indication for the removal of the tonsils and adenoids. Occasionally a considerable collection of pus is located at the base of the tonsil, in which case radical cure can be effected only by operative procedure.

It should be stated again that tuberculous processes in the lymph nodes, particularly in the bronchial glands, may give rise to febrile reaction whose origin it is difficult to explain. The X-ray examination of the thorax or the occurrence of a positive tuberculin reaction on the skin sometimes gives a clew to the diagnosis in this latter group of cases.

In a general survey of this kind, only the most salient points have been touched. For greater detail covering the various diseases, the reader is referred to the appropriate articles.

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ISAAC A. ABT, M.D.,
Editor of 'A System of Pediatrics'.

CHILDREN, Legal Codes Relating to. Legislation in behalf of dependent, neglected, delinquent and defective children has been accidental and unsystematic until within the past few years. A progressive governor recommends the creation of a juvenile reformatory, a State home for dependent children, a school for feeble-minded children or a State board of children's guardians; or a philanthropic legislator introduces a bill for such an institution, and straightway it is created, without any intelligent study as to whether it is needed or whether something else is needed more.

In 1908 the British Parliament enacted an elaborate Children's Act, which was characterized by the Hon. Herbert Gladstone as "the Children's Charter."

In 1911 a bill, prepared by Judge George S. Addams, of the Cleveland juvenile court, was passed by the Ohio State legislature, providing for a children's code commission. This commission consisted of two eminent lawyers, Judge Daniel Babst and Arthur D. Baldwin, Esq. After a careful study of the children's laws of Ohio and other States, they produced a comprehensive children's code, covering the care, training, protection and supervision of dependent, neglected, delinquent and defective children, including juvenile courts. The code authorized the board of State charities to supervise and certify all public or private institutions and associations which receive and care for children. The board was also authorized to become guardian of such children and place them in family homes.

The Ohio children's code marked a new era in children's legislation in that it aimed to cover all of the obligation of the mother State toward children who lack proper care and training.

The governor of Missouri, in June 1915, appointed a children's code commission of 23 men and women "to revise the existing laws relating to children, to prepare such new legislation as might seem desirable, and to bring together in one code all the laws relating to children." No funds were provided by the State, but the commission raised $1,500 by subscription for expenses.

The commission organized seven sub-committees on general laws for the protection of children; public administration; delinquent and neglected children; defective children; destitute children; child labor and education; and health and recreation.

The commission submitted a code consisting of 42 bills to the legislature of 1917, covering the entire field of child welfare; but, owing to the large membership of the committee and the difference in point of view of the different sub-committees, the commission was not unanimous

in its recommendations. The legislature enacted 11 out of the 42 bills submitted and the remainder went over to the next legislature. Much of the legislation adopted was distinctly progressive.

The governor of Minnesota, in August 1916, appointed a commission of 12 members to "revise and codify the laws of the state relating to children." Although the time available was only six months, the commission worked with extraordinary industry, unanimity and wisdom.

In February 1917, they submitted to the legislature a code consisting of 41 bills, of which 35 were enacted into law. It is unquestionably the most advanced and coherent body of law relating to children in the United States. Chapter I is "An act to give the State board of control general duties for the protection of defective, illegitimate, dependent, neglected and delinquent children; with authority to act as guardian of children and to provide for child welfare boards in the several counties of the State to aid in the performance of such duties." Chapter II defines the duties of the district, juvenile and probate courts respecting children. Chapter III relates to crimes by and against children. Chapter IV regulates child labor and provides a minimum wage commission to establish proper wages for women and children. Chapter V, on education, deals with compulsory school attendance and the education of defectives. Chapter VI, on recreation and health, regulates parks and playgrounds and midwifery. Chapter VII relates to the support of children by relatives and counties. Chapter VIII provides for the regulation of private institutions and societies for the care of children and the supervision of placed-out children by the State board of control. (The supervision and certification of private agencies and institutions for children is authorized in Chapter I). Chapter IX relates to illegitimate children. It provides for an examination, on request of a mother, to determine the paternity of an illegitimate child and that when the paternity is judicially established the father "shall be subject to all the obligations for the care, maintenance and education of such child, and to all the penalties for failure to perform the same, which are or shall be imposed by law upon the father of a legitimate child of like age and capacity."

A National Committee for Standardizing Children's Laws was created in 1915 to promote the enactment of children's codes, and the National Child Labor Committee is working in the same direction. Movements are in progress for children's codes in several States. Michigan has a permanent commission created by the legislature of 1917.

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HASTINGS H. HART,
Director Department of Child-Helping, Russell Sage Foundation.

CHILDREN, Neglected.— The term "neglected children" is often confused in the minds of people and even in the laws of the State with the terms "dependent" and "delinquent," but while these conditions shade into each other so that the same child may even be in all three conditions, neglected, dependent and delinquent, nevertheless, it is important to distinguish these three classes, as clearly as possible, both in language and in law.

A delinquent child is one who has transgressed the law or is incorrigible, or who knowingly associates with criminals or vicious persons. A dependent child is one who is orphaned or homeless, or has no responsible relative or guardian to care for him. A neglected child is one whose relatives or guardians fail to perform their duty, do not provide a proper home, do not care properly for him or treat him with cruelty. Examples of neglect would be a father who spends his earnings in dissipation, leaving his family to suffer; a well-to-do widower who brings to his home a woman of bad character and puts his daughters under her charge; a mother who is slatternly, lazy and dirty, and who allows her children to run the street without restraint; a mother who leads an immoral life in her own home; parents who do not send their children to school or who send them out to beg or to steal, or who beat them cruelly; quarrelsome and divorced parents whose conduct deprives their children of home life and alienates them from their natural protectors.

In many communities there have been organized societies for the prevention of cruelty to children, which are designed for the protection of neglected children and whose services are invaluable. About 150 such societies are registered in the United States. Some of the societies for the prevention of cruelty are militant. Their policy is to deal promptly and sternly with recreant parents and to make them realize that neglected children have a powerful and active friend acting swiftly and aggressively against those who do them wrong. Other societies are constructive in their policy. When they find a child who is neglected or ill-treated by his parents or employers, they first seek to discover the cause of such conduct. Is it because the parents are ignorant or because they are following the practices which prevail in their native country or because they have not been able to adjust themselves to the novel conditions which they find in this country? Can the home conditions be remedied by admonition, advice or supervision? If so the effort is made to rehabilitate the home before resorting to extreme measures, and arrest, trial and punishment are used only after milder measures have failed. This method has been used successfully in Boston and Philadelphia.

In the smaller communities, it is difficult to maintain, separately, aid societies for the care of dependent children and societies for the prevention of cruelty, to care for neglected children. It is very desirable that the two functions should be united in one society and the constructive method lends itself readily to this

consolidation. Most of the societies for the prevention of cruelty to children co-operate closely with the juvenile courts. In New York city the society furnishes investigating officers for the children's court, maintains a detention home for children awaiting trial, and has officers in attendance upon all sessions of the court to attend to the interests of children. See CHILDREN, DEFECTIVE; CHILDREN, DELINQUENT; CHILDREN'S COURTS.

HASTING H. HART,
Director Department of Child-Helping, Russell Sage Foundation.

CHILDREN, Spirit of Modern Legislation Affecting. Prior to the year 1899 children who committed offenses against the law were dealt with by the courts as criminals. They were arrested by the police, detained with adult criminals in police stations and jails, arraigned in police courts, where they listened at the trial of older criminals. They were indicted by the grand jury, tried in the criminal court, convicted of crime, and sentenced like older criminals. This process was demoralizing and hardening. Efforts were made in some communities to avoid these evils. In some parts of Canada and in Boston, children were tried separately from adults, but they were still regarded as "juvenile criminals." In 1899 the legislature of Illinois enacted the first "juvenile court law," which revolutionized the treatment of juvenile offenders throughout the United States, and has affected it also in foreign courts. The juvenile court law of Illinois rejected the title "criminal" for children under 16 years of age, and classified them as "juvenile delinquents." It took children from the jurisdiction of the police court and other criminal courts and placed them under the circuit court, which is a civil court, and a court of chancery. They were no longer tried under the criminal laws but under the chancery laws. This meant that they were no longer regarded as enemies of the State, to be hunted down by the police and punished according to the enormity of their offense, but that they were regarded as wards of the State, to be reformed, trained and guided into wholesome and decent lives. This law has resulted in a complete change of practice in dealing with delinquent children. Instead of a warrant for arrest, a summons is issued to the parents or custodian, to bring the child to court. Instead of confinement in jail, pending trial, the child remains at home, or is kept in a "detention home" apart from any prison. Instead of a policeman or a deputy sheriff, his father or mother brings him into court. Instead of an indictment for crime, there is a petition alleging that the child is delinquent. Instead of a prosecutor employed to make a case against the child, there is a probation officer appointed by the court "to represent the interests of the child." In short, the case is not "The State of Illinois *versus* Harry Jones," but "The State of Illinois *pro* Harry Jones." The court seeks to ascertain the facts not as a basis for inflicting a penalty, but as a basis for doing whatever may appear to be for the best interests of the child. Proceeding on this basis, a preliminary investigation is made by a probation officer for the information of the court. The ordinary rules of evidence are modified and the probation officer is allowed to give hearsay evidence, or the child is encouraged to tell his own story of the case. A jury may be called, but the jury cannot find the child guilty of any offense, it can only find that he is in the condition of delinquency. When the testimony is concluded, the judge does not pronounce a sentence. He may make an order returning the child to his own home, with an admonition to his parents; or he may make an order placing the child on probation, under the care of a probation officer, either in his own home or a foster home; or he may make an order, committing the child to a juvenile reformatory — not for punishment but for training and education. The juvenile court idea commended itself to the practical judgment of jurists and legislators, and juvenile court laws have been enacted in most of the States of the Union. In many States the chancery principle has been adopted; in others the jurisdiction of the criminal courts continues, but, in general, the effort is made to free the child from the stigma of crime, to separate him from the adult criminal, to surround him with good influences and to give him the opportunity for development into a normal, wholesome and happy life. Most of the juvenile court laws provide that, whenever possible, the child shall be brought into court not on a warrant but on a petition; and that the child shall not be confined in any jail or prison where adult prisoners are kept. The success of the juvenile court depends largely upon the spirit and temper of the judge. In some cities as in New York and Philadelphia, the juvenile judges were frequently changed, but experience proved that this plan is undesirable, and now, as a rule, the juvenile judges serve for several years in succession. It is generally recognized that the essential feature of the juvenile court is the probation system. Under this system the boy or girl is placed under the watch-care of a selected probation officer, a man or a woman chosen with special reference to their wisdom, tact and patience. The probation officer makes a preliminary investigation of the case before the trial is held, visits the child from time to time in his home, advises the parents, admonishes the child, and acts as the representative of the court. If the child's home is unfit he may be placed in a foster home under the watch-care of the probation officer and then the probation officer stands as his next friend and adviser. There is increasing effort to select probation officers of high character, intelligence and wisdom. In the large cities they are selected by civil service examinations which are generally conducted in such a way as to bring out the special fitness of the candidate. In connection with the probation system a plan has been evolved known as the Big Brother and Big Sister Movement, originated by Ernest K. Coulter, Esq., formerly chief probation officer of the Children's Court of the Borough of Manhattan in the city of New York. This plan enlists young men and women who co-operate with the probation officers and become responsible for the personal oversight and guidance of one or two individual children. The relation between the big brother and the little brother is made as humane and close as possible. The big brother, in his own way, undertakes to establish a relation of friendship and confidence with the boy and to

assist in building upright character. In Massachusetts, New York and Illinois State probation commissions have been organized to direct the work of probation officers, both for adults and juveniles.

HASTINGS H. HART,
Director Department of Child-Helping, Russell Sage Foundation.

CHILDREN OF THE ABBEY, The, a once famous romance, by Regina Maria Roche (q.v.), published in 1798. The Earl of Dunreath, marrying a second time, is induced by the machinations of his wife to cast aside her stepdaughter, for a luckless marriage. It is with the children of this marriage that the story deals. The motherless Amanda is the heroine; and she encounters all the vicissitudes befitting the heroine of the three-volume novel. These include the necessity of living under an assumed name, of becoming the innocent victim of slander, of losing a will, refusing the hands of dukes and earls, and finally with her brother, of overcoming her enemies, and living happily in the highest society forever after.

CHILDREN OF EARTH. In 1913 Mr. Winthrop Ames, of the Little Theatre, New York, offered a prize of $10,000 for the best play by an American author. The manuscripts were to be submitted anonymously. In June 1914 the judges, after having gone through 17 manuscripts, awarded the prize to Miss Alice Brown, of Boston, for her play of New England life, 'Children of Earth.' This piece was given its first production at the Booth Theatre, New York, on 12 Jan. 1915. It was hailed in the press as an effort showing high literary and poetic quality, but it failed of popular appeal because it was a middle-age romance and lacked true, red-blooded passion.

The heroine, worn out with self-sacrifice, and grown old in the service of her conscience, experiences a last mad flame of youth in a wild, unexplainable adventure with one Peter Hale. This flame finally dies down in the last act, and our New England heroine is finally crushed by circumstance.

Though the play has literary quality, it is defective dramatically. It is too intent on externalizing New England types. But none of the New England characteristics are deeply ingrained in the characters; they are superimposed upon them in order to furnish a *genre* picture.

There is the passion of great souls in Mary Ellen and Peter Hale; they are too detached in their poetic love, too lukewarm in their determination to take from life what it has to give them. The consequence is that when the New England conscience drives them back into conventionality, both the theatre audience and the reader are unconvinced of the logical reasons for their mad adventure. The other characters in 'Children of Earth' are types, not human beings definitely interwoven into the plot. That is why the play failed on the stage. In its printed form, while it leaves one unsatisfied, it at least convinces one that here is an American drama with literary quality which dominates over its dramatic effectiveness. The play was reviewed by Clayton Hamilton in *The Bookman* (41:62).

MONTROSE J. MOSES.

CHILDREN OF THE GHETTO, a noted book by I. Zangwill (q.v.), published in 1892. It is, as the author says, "intended as a study, through typical figures, of a race whose persistence is the most remarkable fact in the history of the world." The book raises problems that it does not solve; but the masterly and sympathetic exposition of the Jewish temperament invites a better comprehension of that wonderful race.

CHILDREN OF GIBEON, a popular novel by Walter Besant (q.v.), published in 1886. Like his 'All Sorts and Conditions of Men,' it deals with society in both the west and east ends of London, and their relations to each other. The plot is so ingeniously managed that it seems entirely plausible; the studies of London wage-earners and London slums are faithful, without being too repulsive; and the tone of the book is cheerful, while many social problems are touched in the course of an entertaining story.

CHILDREN OF THE SOIL, a novel of modern Polish life, by Henryk Sienkiewicz, published in 1894. There are interesting side issues to the story, involving questions of property, of the social order, of marriage. The work as a whole is realistic, sane in spirit, genial and broad in its conception of life and character.

CHILDREN IN THE WOOD, The, or **THE BABES IN THE WOOD,** an old English ballad, telling the story of two children whom their uncle wished to murder and who were left to die in the woods, by the man who was ordered to kill them. The authorship is unknown, and the date uncertain; it appears in the *Stationers' Register* of 1595, and was probably written about that time. An old play, published in 1601, has a similar plot, and the source of the two is supposed by some critics to be the same.

CHILDREN OF THE WORLD (*Kinder der Welt*). This novel (1873), by Paul Heyse, is the literary echo of the discontent and rebellion against the existing order — political, religious, social and economic — which, beginning in the universities of Germany, spread through the land in the period between the Revolution of 1848 and the Franco-Prussian War. It is a perfect example of the "Tendenz-Roman" which such eras of unsettled thought and altered human values engender. Except in its treatment of women which, although erotic, is romantic in the extreme, the book is the philosophy of Schopenhauer and David Strauss reduced to novel type. Every problem of the age is set forth in the person of one of the characters. There is the ascetic-erotic-intellectual hero, without honor in the university because of his freedom of thought; the unawakened but erotic heroine, natural daughter of a landed aristocrat without morals; the ugly but talented feminist musician; the highly spiritual, ill-nourished carpenter brother of the hero; the hounded young socialist-atheist; the kindly old artist with no vision beyond the nearest fence; the over-fed, material, unspiritual, vengeful teacher of the gospel; and a dozen more of their fellows. 'Children of the World' has been called the "romance of pessimism" and "the apotheosis of atheism." The very name, in which 'Children of the World' is contrasted

with 'Children of God,' i.e., the clergy, is argumentative. The wonder is that in spite of its faults, its lack of spontaneity, its persistent preaching, and its iconoclastic tendency, the book remains good fiction. The characters all say too much and do too little, but so they would in real life; they are all exaggerated types, but the exaggeration is not that of unreality but of that violation of the norm which accompanies social rebellion.

EDITH J. R. ISAACS.

CHILDREN'S AID SOCIETY, an association for the rescue of neglected, dependent or wayward children. The first society so-called was founded in 1853 at New York by Charles L. Brace. It trains the children and seeks to find situations and homes for them preferably in country districts. Similar societies have been founded in all cities and are accomplishing marvels in rescue work. See CHILDREN, DEPENDENT.

CHILDREN'S BUREAU, a bureau in the Department of Labor (in the Department of Commerce and Labor in 1912–13), established by law of 9 April 1912. It is authorized to investigate and report to the department all matters pertaining to child life or welfare. The birthrate, infant mortality, accidents and diseases of children, child labor, juvenile courts, State labor laws in relation to children all come within the province of the bureau. The chief of the bureau is nominated by the President and confirmed by the Senate. Miss Julia C. Lathrop was the first chief.

CHILDREN'S COURTS. Special judiciary institutions for dealing with cases of juvenile waywardness or parental remissness in a reformative rather than a retributive spirit. The general theory of these courts is that, for obvious reasons, children should not be judged in ways and by means designed for their elders; that, in other words, the delinquent child is not to be regarded and treated as a criminal, but merely as an unfortunate needing the special supervision or protection of the State. The most advanced view of the matter is that such children, being themselves the victims of unfavorable environment over which they have no control, must be dealt with sympathetically and educationally. From this standpoint, the children's courts may well be considered a sociological and educational agency rather than a legal institution. Their inception and development, at any rate, were more in line with the former than the latter, as we shall see presently. They received both their impetus and their general character from the enlightened modern view of juvenile delinquency, and were made imperative by the scientific results attained in the general field of Child Study (q.v.).

History.— Although the juvenile court is a comparatively new institution — less than 20 years old, in fact — there is no unanimity among writers on this subject as to where and when the very first real children's court was established. Claims of priority are made for the States of Massachusetts, Rhode Island, Colorado and Illinois — which leaves the honor safely to the United States. The uncertainty on this point is due partly to failure to discriminate between the actual establishment of children's courts and the sundry legislative enactments that preceded them. Thus Massachusetts, which passed the first statutory law on the subject of probation and granted children separate trials as early as 1869, has the best claim to priority in children's court legislation — legislation which practically started the children's court movement in America; while Illinois, with her official juvenile court established at Chicago in 1899, seems to have an equally valid claim to priority in the matter of actual children's courts. The Illinois innovation gave such impetus to the juvenile courts' movement that children's court laws were soon passed in New York, Rhode Island, Kansas, Wisconsin, Pennsylvania, Colorado and elsewhere. The second children's court was established at Philadelphia in 1901. New York city and Baltimore followed suit in 1902, and Saint Louis a year later. It is neither possible nor desirable to enumerate all the others, since there is hardly a city worthy of the name that has not established some kind of juvenile court. An idea of the rapid growth of the movement may be had from the fact that in four years (1903–07) no fewer than 18 States either established children's courts or adopted legislation to that end.

Of course, the children's court movement has not been confined to the United States, where it originated and is best developed. Among its foreign promoters, Canada may be ranked first, since her juvenile court legislation antedates even the famous Juvenile Court Act of Illinois. Indeed, the Chicago court itself seems to have been forestalled in South Australia, which created a State children's department in 1895 and a juvenile court three years later that served as a model for the very efficient children's court of Toronto. Since then every important country in Europe and at least one in Asia has been studying and adopting the American juvenile court system in one form or another. Several international congresses for the study of juvenile court problems have already been held, and the world-wide interest in this new movement is most encouraging. Both England and Germany have very comprehensive laws on the subject, though the former has made greater progress in juvenile court legislation than any other country in Europe, as may be judged by her unique Children's Charter.

Scope and Procedure.—As children's courts are still in a formative stage, neither their scope nor their methods of procedure are uniform or well-defined. Both vary in different cities and States, depending upon local conditions. In general, their scope has broadened steadily throughout the country and their methods have been more advanced in the Western States than in those of the East. Beginning as institutions for dealing with juvenile offenders, their scope has gradually been extended to include every phase of juvenile delinquency, parental neglect, and maltreatment of children, however caused or legally defined — every conceivable offense, in short, committed by or against children. The broadest view of the functions of children's courts, therefore, seems to make of them official child-welfare agencies; and much of the opposition to these institutions has been aroused by such liberal interpretations of their scope. But neither in theory nor in practice do all children's courts claim such seemingly unlimited jurisdiction. The juvenile court of Saint Louis, for in-

stance, confines itself to delinquent and dependent children; that of Chicago, to delinquent, dependent and neglected children; while that of Philadelphia deals with all these and incorrigible children besides. Parental neglect and other contributory causes of juvenile delinquency were recognized and dealt with as early as 1907 by the laws of Colorado, which established the first complete children's court in the world. This type of juvenile court is empowered even to proceed criminally against parents, guardians and all other persons chargeable with serious offenses involving children. Other children's courts—notably that of Indianapolis, perhaps the most complete and efficient children's court in the world—have found themselves drawn into the affairs of the home, encroaching, that is, upon the field of the domestic relations court. This process went so far in the city of Indianapolis that its juvenile court and the domestic relations court were actually combined in 1911. Adult contributory delinquency laws are now quite common, many States having followed the example set by Colorado — Virginia, Rhode Island, New York and Kentucky in 1910, and others since. Thus does the growing realization that the erring or wayward child is but a product of home, school and society continually enlarge the scope of children's courts. In line with this general tendency juvenile court laws, which originally applied to children under 16, have recently raised the age limit to 18 years. Indeed, a few children's courts — those of Denver and Buffalo, for instance — have jurisdiction even of adolescents ("adult delinquents") between the ages of 16 and 21.

Under such varying circumstances, uniformity in children's courts' procedure can hardly be expected. This depends very largely upon the particular judge in charge, the nature of the community concerned, and the laws under which proceedings are conducted at any given place. The general attitude of these courts being corrective rather than punitive, their hearings are usually very simple and informal — even private at times. No juries are called, and no charges or criminal accusations can be made against juveniles, no matter what the offense may be, since a child cannot be considered a criminal under juvenile court laws. The rules of evidence are partly or wholly disregarded. Such information as may be needed is usually obtained *before the hearing* by a probation officer, who conducts all preliminary investigations and reports the facts to the judge. The latter may supplement these data by such additional information as parents and others can furnish upon the child's character, environment and antecedents before disposing of a particular case. Invariably, too, the child is privately interviewed by the judge and encouraged to tell his own story in confidence. Once a child is found delinquent — verdicts of "guilty" and "not guilty" are, of course, out of the question in strictly juvenile cases — many courses are open to the judge. The child may be (1) returned to his home on probation, that is, in charge of a probation officer; (2) placed out in some foster home until ready to return to his own; (3) committed to the care of some children's society available for the purpose; or (4) sent to a reformatory institution. The order of enumeration is, obviously, the order of preference. The child's natural home, if not positively forbidding, is by all means to be preferred. Next comes the temporary home for such children as must, for whatever reason, be put beyond parental control. Only when neither of these courses are deemed expedient should society care be invoked, and, as a very last resort, the reformatory is to be used. The best juvenile court judges — and this is one test of their fitness — resort to institutional care with increasing reluctance. In any case the delinquent child passes automatically into the custody of the court and becomes a ward of the State. The spirit of the most progressive and efficient children's courts is indicated by certain delinquency laws, which expressly stipulate that the treatment of the child under them "shall be as nearly as possible like that of parents." Unfortunately, far too many children's courts are not yet conducted in this enlightened spirit. Some of them (a gradually decreasing number) still cling to the traditional manner of court procedure — even to the rules of evidence, criminal charges and the pronouncement of guilt or innocence.

Results.— The success of any particular children's court depends very largely upon its judge and probation officer, both of whom should be broad-minded and large-hearted persons, fully in sympathy with the problems of child-life and conversant with the essential teachings of child psychology. Special insight into local conditions and resourcefulness in the disposition of cases are, of course, other necessary qualifications in the juvenile court judge; just as maturity, a high moral purpose, and tact are among the indispensable qualifications in a good probation officer.

The general results of the establishment of children's courts have been manifold and far-reaching. The juvenile courts have accomplished at least four distinct and important results. They have (1) separated the child offender from the adult criminal, thereby rescuing him from crime-breeding association and criminal court procedure; (2) made the former victims of retributive justice objects of sincere solicitude to an official child-welfare agency; (3) helped to lead parents to a better realization of their responsibility for the child's waywardness; and (4) obviated the necessity of jailing the juvenile offender, thus making the life-long sting of "convict children" forever impossible.

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DAVID A. MODELL.

CHILDREN'S CRUSADE, The, a singular movement in 1212, preached in France by Stephen, a peasant boy, and in Germany the same year by Nicholas, also a peasant boy. Some 90,000 children left their mothers and schoolmasters in the spring "to rescue the Holy Land from the infidels," and ships were placed at their disposal. The French contingent embarked at Marseilles in August; part perished the same month by shipwreck on the island of San Pietro, and the rest were sold into slavery to Mohammedans. The German contingent reached Genoa in August, and was utterly dispersed by various disasters before the next spring. See CRUSADES.

CHILDREN'S LIBRARIES. In a concrete sense, special collections of books intended for juvenile readers and usually kept in separate rooms of general public libraries. From a broader point of view, however, children's libraries may be defined as an educational agency seeking to acquaint the young with the world's best literature and to cultivate an abiding love for good reading. Their work, therefore, supplements and transcends that of the public schools which exercise but a limited influence on the child's outside reading.

History and Development.— Active library work with children is a comparatively recent development — not more than 35 years old, at the utmost. Owing, however, to the laxity with which the term children's library has been used, there is considerable uncertainty as to just where and when the institution originated. Sporadic and usually abortive efforts in this direction appear to have been made as early as 1885, when a children's library was opened in New York by a public school principal (Emily S. Hanaway). A more successful experiment was made, also in New York, the following year, when a separat library for children was opened as a branch of the Aguilar Free Library. But these forerunners of the children's library movement do not appear to have been generally imitated before 1890, when a children's reading room was opened at the Brookline (Mass.) Public Library. Soon thereafter special provisions for children in public libraries were made at Buffalo, Cleveland, Pittsburgh, Philadelphia, New York, Lowell, Medford, Brooklyn, Pawtucket, New Haven and elsewhere. By 1896 Milwaukee, Denver, Detroit, Omaha, Seattle and San Francisco — the movement spreading more rapidly in the West — all had their children's departments. To the Minneapolis Public Library, however, seems to belong the honor of first recognizing the full importance of the children's library movement by making adequate provisions for library work with children in 1893. By 1897 the movement had assumed such proportions that the American Library Association made the subject of children's libraries a special topic for discussion at its annual conference at Philadelphia that year. This gave so much additional impetus to the movement that children's departments or children's rooms soon became a component part of every progressive public library in the United States. The best of these carry on systematic work with children and have all the delightful adjuncts of children's rooms. In some instances even — in such cities as Brooklyn (N. Y.), Cleveland and Griffin (Ga.) — children's libraries are housed in entirely separate buildings, which naturally afford many exceptional opportunities. This indicates how juvenile readers have come to their own in our public libraries since the day of "children's corners," designed quite as much to keep children out of the way of adult readers as for their own good. In most of the larger cities of the Uinted States children's libraries are now completely organized and fully supervised. In such cities the central library serves as a model for the various branches, all of which are administered and conducted in accordance with the general principles formulated by the supervisor.

Some idea of the general growth and popularity of children's libraries may be had by a glance at a few actual figures. In 1914 there were over 1,500,000 volumes intended specially for juvenile readers in but 51 of the larger libraries in the country, which shelved some 300,000 new volumes in 1913 alone. By a very conservative estimate half a million children held library cards the same year, drawing more than eleven million books for home use in the few libraries above mentioned. Of course such large library centres as those of Pittsburgh (Pa.) and New York, where children's libraries constitute an entirely separate system, present figures even more impressive. In 1915 the various children's library branches of Pittsburgh had 119,678 volumes and a circulation of 702,139. During the same year the combined circulation of all the children's branches of Greater New York exceeded seven and a-half million volumes (7,6.),462, to be exact), while the number of children using the 44 branches of three of its boroughs (the boroughs of Manhattan, the Bronx and Richmond) was 1,608,753. The great popularity of children's story hours, an important and seemingly indispensable phase of library work with children, may be judged from the fact that 119,678 children attended them in 1915 in Pittsburgh alone. In New York, exclusive of the boroughs of Brooklyn and Queens, 2,489 story-hour groups gathered during the same period in the various branch libraries and the Central Children's Room. At the latter, on one special occasion, the number of auditors was 270.

The children's library movement abroad has not, on the whole, kept pace with its rapid development in the United States. Not even England and Germany have caught the full educational significance of this movement. In England the limited funds available under the Public Library Acts has greatly hindered progress in this direction. In Germany, likewise, the juvenile library movement has lagged behind considerably, despite a very extensive and

well organized library system. Both joined the movement very recently. Germany, for instance, opened her first children's library only in 1909 and even five years later had children's rooms in but 30 cities — a showing easily surpassed by Denmark, where by 1916 more than 400 children's libraries had been opened, 62 in Copenhagen alone. Russia, on the other hand, has more separate libraries for children than many a more progressive country. In 1915 there were at least 10 such libraries in Moscow alone. But the American example is gradually making itself felt to the ends of the civilized world — in Sweden, New Zealand, Japan, etc. — and there is probably no large book-reading community anywhere that has not some kind of children's library or reading room.

Aims and Means.— Besides the chief aim of children's libraries — the general aim already mentioned, which may be called inspirational — there is another and perhaps a secondary aim, which may be called informational. This consists in teaching library children, directly or indirectly, the intelligent use of libraries and their accessories, including such indispensable library tools as books of reference and card-indexes. Speaking relatively, the second aim is really a means to the more general end for which libraries are maintained; for, obviously, the better children learn how to use the resources of their own libraries the more they necessarily contribute to the efficient use of the adult department.

The attainment of these general aims involves various more or less distinct lines of work with children, which naturally varies both in kind and degree with local conditions. In general, according to an eminent librarian (Arthur E. Bostwick), "a typical children's department of an American public library carries on some or all of the following kinds of work: (1) Controlled and guided circulation of books for home use; (2) use of books and periodicals as in an ordinary reading room; (3) reference use of books, largely in connection with school work; (4) work with very young children, chiefly by means of picture books; (5) exhibitions, the display of illustrated bulletins, etc., always in connection with courses of reading; (6) story-telling to selected groups." The three great factors in carrying on these manifold activities are, of course, the children, the books and the librarians; and although the success of any particular library centre depends upon all three, only the second and third elements can properly be considered in this article.

The selection of books for a children's library is at once the most difficult and most important task of the children's librarian. Great diversity of opinion prevails on this subject among librarians themselves, and while the problem of children's reading is a new and very serious one (see CHILDREN'S LITERATURE), the conscientious librarians are trying hard to solve it. Since the establishment of children's libraries, policies as to the choice of books have varied all the way from puritanical exclusion of everything not positively didactic to latitudinarian inclusion of everything the child will read. Such extreme views of the function of children's libraries have naturally put their supervisors on their guard, with the result that, although the golden mean has not yet been generally attained, far higher standards of book selection prevail in children's rooms than in the average adult department. The best children's libraries follow neither moral nor literary criteria to the utter disregard of children's tastes, but provide enough books in sufficient variety to supply the normal needs of boys and girls of all tastes and of all ages. Special attention, too, is given in children's rooms to the mechanical features of the books selected — such as editions, type, binding, and illustration — since it is realized that attractiveness in children's volumes has more than the obvious æsthetic end to recommend it. Indeed, the ideal children's book shelf, already the most attractive in the whole public library, is gradually being made a thing of beauty as well as a joy forever.

Next in importance to the quality and quantity of the books in a children's library are the personality and qualifications of the children's librarian, upon whom the success of the children's room largely depends. Consequently, the most experienced assistants — experienced in dealing with children as well as in library routine — are coming to be employed in the best children's rooms. Such librarians should know intimately the entire range of juvenile literature and be in thorough sympathy with the rising generation of book readers, whose reading they must guide and direct, if they would make the most of their vocation. Besides expert knowledge of children's books and special library experience, aptitude for work with children is an indispensable requisite in the children's librarian. Indeed, so important and responsible is her position that special preparatory courses are now given for such work in nearly all library training schools, at least one of which (The Carnegie Library of Pittsburgh) devotes itself exclusively to the professional training of children's librarians — a training that may well be made as broad and as cultural as is required for the profession of teaching.

DAVID A. MODELL.

CHILDREN'S LITERATURE. Books written for or suited to the young. From a stricter point of view, children's literature comprises books specially written for children. In either case, books about childhood intended for adult readers are excluded and will not be considered in this survey. But it is really impossible to define children's books without instancing titles of children's favorites. Such a list would show, for one thing, that quite as many works not written for children have found favor with them as those that were. Thus, parts of 'The Bible,' Homer's 'Odyssey,' 'The Pilgrim's Progress,' 'The Arabian Nights,' 'Gulliver's Travels,' and 'Baron Munchausen' — none of them intended for children — are just as much children's books as 'Alice in Wonderland,' Andersen's 'Fairy Tales,' 'The Water Babies,' and 'Peter Pan' — which were expressly written for juvenile readers. That the former should be much relished by children and the latter also by adults, proves conclusively the impossibility of drawing a hard-and-fast line between juvenile literature and other kinds of books. Any book that interests or comes within the comprehension of children generally may therefore be considered as belonging to the large and miscellaneous class of children's books.

History.—The difficulty of formulating a satisfactory definition of children's books adds to the perplexities of the historian of juvenile literature and helps to account for the woeful want of chronological definiteness in many histories of children's literature. Thus, while some of these date the beginning of children's books from 1715 — that is, from the appearance of Isaac Watts's 'Divine and Moral Songs' — others go back as far as the 7th century — to a Latin work by one Aldhelm, Abbot of Malmesbury, and to the school texts of the Venerable Bede. For our purposes this sketch need not extend beyond the 15th century, before which children's books can hardly be said to have existed. What are now considered such by some imaginative historians were mainly lesson texts, written in Latin and intended generally for pupils in monastic schools. Such works belong rather to the history of education than to the history of children's literature. Passing by therefore the pseudo-juveniles of Aldhelm, Bede, Alcuin and even Aelfric, whose 'Colloquy' was one of the most interesting beginnings of books for the young, we come to the peculiar 15th and 16th century productions whose nature and purpose we shall now consider.

The Early Period.— During the 15th century real attempts at the writing of children's books were made by various authors, whose chief purpose was moral or other instruction. This appears in their very titles: 'The Babees Boke; or, A lytyl Reporte of how Young People should behave' (circ. 1475); 'The Boke of Curtesye' (1460); Simon's 'Lesson of Wysedom for all Manner Chyldryn'; and the like. All these were written in Latin — one of them, 'Stans Puer ad Mensam' ('The Page Standing at the Table,' 1430) still preserves its Latin title — and most of them in rhyme. Not only was their general tone moral or didactic, being intended to inculcate lessons in manners and conduct, but their appeal was very limited, being addressed mostly to boys of noble families destined to serve as pages, esquires, etc., on to the rank of knighthood. There was not even the sugar-coating of narrative to render such wholesale didacticism palatable. In no sense of the word, therefore, can these 15th century rhymed treatises be considered as children's books.

The next stage in the development of children's reading was reached toward the end of the 16th century, with the invention of *The Hornbook* (q.v.), which for the first time put reading matter into the hands of children. Such instruction as this crude device contained was decidedly religious. A variation of the Hornbook, however, which appeared a century later and was known as the 'Battledore,' "contained easy reading lessons and little woodcuts, besides the alphabets, numerals and so forth, but never any religious teaching. Now and then a short fable or didactic story appears." These battledores, crude makeshifts for modern primers, were long very popular, surviving into the second half of the 19th century.

Much more interesting to the unsophisticated boys and girls of this period must have been the numerous ballads, which, circulating freely among the common people, could not fail to attract the attention of the young. Among the better known of these old ballads were Adam Bell, Guy of Warwick, Friar Bacon and Friar Bungay, and the prolific Robin Hood series. It was these and other mediæval ballads that have yielded such nursery favorites as Jack the Giant Killer, The Babes in the Wood and Tom Thumb and that in the 17th and 18th centuries became so popular in the form of chap books, of which more presently. It is interesting to note in passing that those ballads have survived the longest which appeal most strongly to juvenile readers.

The Middle Period.— Having learned their letters from the 'Battledore' 17th century children had no means of satisfying their craving for reading save the above-mentioned *Chap-Books* (q.v.). These cheap and uninviting leaflets, printed in type calculated to ruin children's eyes and illustrated in wood-cuts that violated the proprieties and shocked one's taste, must have been very sorry things indeed. Yet, forbidding as they were, these pamphlets represented the first embodiment of popular literature, intended as they were for every age and taste, and costing but a penny each. Though not written for children, these little tracts, whose popularity was phenomenal and whose vogue lasted far into the 19th century, put within the reach of the young tales of action, stories of heroism and adventure, narratives of peace and war, etc., which must have enchanted the juvenile reader of those early days. It was an unfortunate boy indeed that could not own such things as Jack and the Giants, Guy of Warwick, Hector of Troy or Hercules of Greece in the centuries of chap-books. Indeed, it was in this crude form that such fairy stories as Blue Beard, Cinderella and other of the Mother Goose Tales collected by Perrault, French fountain-head of fairy tales, first appeared. Possibly even such classics as the 'Canterbury Tales' were also peddled about by hawkers on streets and highways, with all the lustiness of a town crier.

To this period, too, belong the stern and gloomy New England Primers, which long embodied the religious features of the horn-books aforementioned. The general tone of the so-called children's books written in Puritan times may be judged from such titles as James Janeway's 'Token for Children; an Exact Account of the Conversion, Holy and Exemplary Lives and Joyful Deaths of Several Young Children,' and Francis Cokain's 'Divine Blossoms; Prospect or Looking Glass for Youth.' Small wonder therefore that, in view of such unimaginative vehicles for religious instruction as these — and their number was appalling — such a gem as Bunyan's 'The Pilgrim's Progress' was eagerly seized upon by juvenile readers, written though it was for their elders.

But, dull and forbidding as were these early attempts at children's books — the hornbooks, chap-books, tokens, primers, etc. — which reached their culmination in such works as Franklin's 'Poor Richard,' they were the undoubted forerunners of real children's literature, whose rise we must now consider. As such, their historical importance should not be underestimated.

The Period of Transition.— The rise of real children's books — that is, books specially written for children — dates from the second

half of the 18th century. It was then that such educational reformers as Rousseau, Froebel and Pestalozzi aroused that new interest in childhood which culminated in modern Child Study (q.v.). Obviously, before this general awakening to the special needs and problems of the child as a child, his reading appeared to involve no special difficulties. One of the first manifestations of this new realization—the realization that the child is not merely a diminutive adult, but a being with tastes and interests peculiar to himself—was the founding of a children's magazine (Weisze's *Kinderfreund*).

But the turning point in the development of children's literature seems to have been reached by 1760, when John Newbery (q.v.), the first publisher of books for children, issued a small collection of nursery rhymes under the title of 'Mother Goose's Melody.' It was five years later that Goldsmith, who probably edited the little volume just mentioned, published his 'History of Margery Two-Shoes,' which is generally considered the first real children's story written—and it is still a favorite with younger children. But the enterprising publisher, assisted by Goldsmith, Dr. Johnson and lesser celebrities driven to hack-work, published hundreds of little volumes for juvenile readers, whose appetites he both stimulated and sought to satisfy. This prolific and ambitious publisher ran the gamut of children's reading, from young folk's magazines to grammar-texts and a 'Circle of Sciences,' a sort of compendium of universal knowledge. The tone of most of the Newbery publications, however, was still didactic. Such titles as 'The Renowned History of Giles Gingerbread, a little boy who lived upon learning'; 'The Whitsuntide Gift, or the Way to be Happy'; and 'The Valentine Gift, or how to behave with honor, integrity and humanity'—and they are not by any means exceptional—sufficiently indicate the type of thing produced by "the philanthropic publisher of Saint Paul's Churchyard," as Goldsmith once called John Newbery.

A somewhat similar service to children's books was rendered in America by Isaiah Thomas, the long-lived Massachusetts printer and bookseller, the pioneer publisher of juvenile literature in the western world. Drawing freely upon Newbery's list, he needed but to alter a bit the English terminology and give the stories a New England setting to make his reprints interesting to children of Colonial and Revolutionary times. In such stories as 'The Juvenile Biographer' (containing accounts of Mistresses Allgoo, Careful and Lovebook, together with the narratives of Mr. Badenough and other heroes) the English text is easily recognizable. They represented no very great advance, it must be admitted, over the least cheerless New England primers. Nor were such of the Thomas publications as were written in America tinged by less sombre sternness. 'Godly Children the Parents' Joy'; 'A Dying Father's Legacy to an Only Child'; and Janeway's 'Token for the Children of New England'—were the self-explanatory titles of some of these. The echo of Puritan England and Colonial America was far too distinct in such children's books—they were in no sense real literature—to make them delightful reading for healthy boys and girls. For that they had still to wait.

In Germany the educator Basedow and others originated a type of literature which, intended for children and undeveloped adults, combines instruction and narrative in an entertaining manner. Although the art of such tales was still crude, they form another interesting link in the evolution of children's literature. It was as a result of this movement inaugurated by *The Philanthropium* (see PHILANTHROPY) that Defoe produced his children's classic, 'Robinson Crusoe,' so many times translated and imitated—only half successfully, it should be noted, in 'The Swiss Family Robinson.'

The Modern Period.—At least four distinct streams of influence are distinguishable in this great period of children's literature, which was well under way by the beginning of the 19th century. These may be characterized as (1) The Rousseau Influence; (2) The Sunday School Influence; (3) The Poetic Influence; and (4) The Classical Influence. We shall briefly consider each of them.

(1) The first of these influences has already been referred to. The enthusiastic disciples of Rousseau who wrote books for children—notably the two Edgeworths, Thomas Day and Mrs. Barbauld—accepted without question the narrowly utilitarian principles propounded in the 'Emile'. The result, so far as children's reading was concerned, was not altogether a happy one. The writers of this school conceived the function of children's books to be informational and reformative. They, in effect, substituted educational and moral didacticism for the religious didacticism of preceding periods. Thus, parents are urged by the Edgeworths in their 'Practical Education' (1796) to banish dolls from the nursery, while the epoch-making 'Parent's Assistant' (1796) and 'Moral Tales' (1801)—perhaps the best known and most meritorious children's books credited to Maria Edgeworth—are equally laden with moral "objects" and information. Day's 'Sanford and Merton' (1783), one of the most famous juveniles of this school and long a children's favorite, would be quite as dull as the Edgeworth books save for its inclusion of some classic tales that constitute its sole redeeming feature. Perhaps even more insipid were the children's books of Mrs. Barbauld, best known for her 'Evenings at Home' (1795), whose every chapter seeks to impart some definite lesson; her 'Early Lessons for Children' (1774), written for the special edification of Charles Aiken, himself a writer of children's books; and her 'Hymns in Prose for Children' (1774), in which, like in all her works, instruction and narrative walk side by side. Among the descendants of these moral and educational writers was Jacob Abbott, author of the once popular Rollo, Jonas and Lucy books.

(2) The writers of juveniles identified with the Sunday School movement, started by Robert Raikes (q.v.), were still too didactic in tone, though their didacticism took on a somewhat social hue. The one direct effect of this movement upon juvenile literature was to create an unusual demand for tracts, a demand which Hannah More was the first to endeavor to satisfy. Her numerous tracts, from 'The Shepherd of Salisbury Plain,' her most famous one, to the least meritorious piety pamphlets, are redolent with a fundamental moral ideal

and abound in real pictures of humble folks worthy of a Charles Dickens. But throughout these and all her longer works, the acquisition of knowledge is considered as but a means to a better understanding of the catechism. The imaginative child's fancy must still content itself with very low flights, if it can rise at all.

Pretty much the same may be said of the juveniles of Sarah Kirby Trimmer, a more famous writer of the Sunday School group, who has been called the parent of the didactic age in England. Most of her books — such as 'Easy Lessons for Children' (1780), 'Easy Introduction to the Knowledge of Nature' (1782) and 'Sacred History for Young Persons' (1785) — were intended for use in the Sunday Schools, which Mrs. Trimmer had helped to open. But it is not for her religious writing as much as for her 'History of the Robins' (1789), which represents the earliest attempt to teach children kindness toward the animal world, that Mrs. Trimmer is best remembered.

Among the many other writers of this school, mention must be made of Mrs. Sherwood, for her 'Fairchild Family' (1818–47), including 'Little Henry and His Beaver,' 'The Child's Pilgrim's Progress,' etc. A distant follower in America was Elizabeth Wetherell, author of 'Queechy' and 'The Wide Wide World,' works far above the average religious or Sunday School story written in America during the last century — such as are exemplified by the Elsie and the Pansy books. In the better stories of this class, though there is an unmistakable religious background, the picture of life is generally vivid and the narrative of considerable interest. The stories of Charlotte Yonge are among the very best religious tales extant.

(3) With the gradual advance made in the literary qualities of children's books, special attention to juvenile poetry came as a matter of course. One of the first writers to pen a volume of verses specially for children was Isaac Watts (q.v.), a man belonging to an earlier age than we are now considering. His name must be mentioned here as a worthy predecessor of the better known children's poets to be spoken of presently. The verses of Dr. Watts — and such a charming hymn as 'Holy Angels Guard Thy Bed' is among the best in the language — show the truest understanding of childhood, childhood seen in retrospect and with an adult's sadness over the lost joys of innocence.

Much more didactic were the Taylor sisters, Jane and Ann, whose poetry makes a far greater appeal to juvenile readers than anything Watts ever penned. Their 'Original Poems for Infant Minds' (1804), containing verses of real merit, seek to emphasize such social virtues as generosity, honesty and truthfulness — an emphasis no longer religious, it will be noticed, but distinctly ethical. Their aim was to interpret the world through the eyes of childhood, an ambitious undertaking in which they hardly succeeded.

Far more successful in this respect were the children's verses of William Blake, whose 'Songs of Innocence' (1787), though chronologically belonging to the 18th century, is of the 19th century in form and spirit. So happily are the modern regard for childhood and the latter's responsiveness to adult sympathy blended in Blake's verses that they suggest the best children's lyrics of Wordsworth and Christina Rossetti. Indeed, nothing finer than his 'Songs of Innocence,' with its remarkable imagery and grace, was added to children's verse before Robert Louis Stevenson's delightfully reminiscent 'Child's Garden of Verses' (1885), which has been the forerunner and inspiration of a great many volumes of poetry for children.

(4) The literary heights reached in children's verse during the 19th century marked but one of the important phases of the rapid development of modern children's literature. Another — perhaps an outgrowth of the first — was the new and increasing zeal for putting the classics within the reach of the young. By the middle of the last century four most noteworthy and very successful manifestations of this salutary tendency appeared. Kingsley's 'Greek Heroes' (1856), Lamb's 'Adventures of Ulysses' (1808) and Hawthorne's 'Wonder Book' (1852) and 'Tanglewood Tales' (1853) practically unlocked for children the rich granaries of Greek mythology, to the infinite delight of generations of eager readers. This gave such impetus to imaginative writing for children that the wonderful flowering of children's literature in the latter half of the century may well be attributed very largely to the classic influence we are here considering. Then it was that the reading child first came into full possession of his literary heritage, the accumulated treasures of imaginative Man.

Classification.— From the early times when children's books were yet non-existent — when children and adults heard the same tales with a common naïveté — to the present fine specialization in books intended for the young, millions of volumes have been published under the general head of Juvenile Literature. With this multiplicity has come also great diversity, so that it is no mean task merely to classify satisfactorily this wealth of material. The task becomes the more difficult in that there are no definite types of children's literature more than of any other, and this, naturally, makes for greater variety. For these and other reasons no adequate classification of children's books will here be attempted. Only a few of the more common types can be considered, and under these general headings: (1) Fairy Tales, Myths and Fables; (2) Historical, Biographical and Other Narratives; (3) Children's Poetry; and (4) Juvenile Fiction. Nor can the treatment even of these be more than summary in the present article. For a fuller study of the subject, the reader is referred to the bibliography appended to this article.

Fairy Tales, Myths and Fables.— Despite the great variety of other books for children that have grown, like mushrooms, since Perrault's pioneer collection of 'Mother Goose Tales' ('Contes de ma Mère L'Oye,' 1697), nothing has displaced the fairy tale in favor with younger children. After Perrault, the greatest contributions to fairy tale literature were made by the Grimm Brothers with their 'Household Tales' ('Kinder- und Hausmärchen,' 1812–15) and by their most distinguished successor, Hans Christian Andersen, with his 'Fairy Tales' (1835), best translated into English by Mary Howitt. Among other literary fairy tale col-

lections, to the making of which there is no end, mention should be made of Kennedy's 'New World Fairy Book'; Rhys's 'Fairy Gold'; Scudder's 'Children's Book'; Jacobs' 'English Fairy Tales' and its companion volume, 'More English Fairy Tales'; and Lang's long Rainbow Series. More in the nature of wonder stories are the Alice books of Lewis Carroll, Ruskin's 'King of the Golden River,' Kingsley's 'Water Babies,' and 'The Arabian Nights.' The charming fairy tales of George Macdonald have such a unique spiritual quality and a distinctive tone of mystery that they may be considered among the best modern specimens of their kind. As a general rule, however, the modern fairy story, cultivated by many mediocre writers, is apt to be lacking in imagination, art and taste.

Mythological tales, which are based upon primitive man's interpretation of nature, run back naturally to the beginning of time. The best myths have come down to us from ancient Greece, and we have already mentioned the three great writers — Kingsley, Lamb and Hawthorne — who first familiarized English-reading children with these most delightful narratives, so full of beautiful imagery and true poetic force. Of the many other versions of the classic myths of Greece, Bulfinch's 'Age of Fable' and Moncrieff's 'Classic Myth and Legend' are perhaps the fullest and best. Next to the Greek myths, the Old Norse myths are particularly interesting to children. They have been admirably retold by Brown ('In the Days of Giants') and Mabie ('Norse Stories Retold from the Eddas'). The mythology of the American Indian, equally full of color, mystery and elemental nature, has been strangely neglected by modern writers of children's books. Longfellow's 'Hiawatha' is still the most beautiful presentation of Red Indian myths. There are, of course, many other kinds of mythical tales, but the three here mentioned possess the best characteristics for juvenile readers.

The fable (q.v.), which is probably of Indian origin and was one of the earliest forms of story-telling everywhere, has been made familiar to children only in modern times. The classic fable of Æsop has never yet been surpassed, if it ever shall be equalled. This form of imaginative literature makes its peculiar appeal to younger children and performs a special mission in their ethical education. Some of the best of Æsop's fables — edited times without number — are 'The Dog in the Manger,' 'The Lion and the Mouse,' 'Belling the Cat,' 'The Shepherd Boy and the Wolf' and 'The Town Mouse and the Country Mouse.' The other two great fabulists were La Fontaine in France and Krylov in Russia, but neither has enjoyed such universal popularity abroad. 'Select Fables from La Fontaine,' translated by Elizier Wright, and 'Kriloff's Original Fables,' translated by Harrison, are perhaps the best two selections from these fabulists available in English. A general collection from Æsop, La Fontaine and others is found in Wiggin's and Smith's 'The Talking Beasts; A Book of Fable Wisdom.' Excellent recent specimens of animal stories that may be classed either as fables or as fairy tales are Kipling's Jungle books and 'Just So Stories.' In a class by itself stands that highly literary and charmingly imaginative modern fairy tale, Lagerlöf's 'Wonderful Adventures of Nils.'

Historical, Biographical and Other Narratives.— For children who have outgrown the world of make-believe these classes of books afford most welcome substitutes. The best kind of historical narrative for children is that which emphasizes the romantic and biographical elements. Such narratives have been written by Scott ('Tales of a Grandfather'), Greenwood ('Merry England'), Lodge and Roosevelt ('Hero Tales from American History'), Eggleston ('Stories of Great Americans for Little Americans'), Baldwin ('Fifty Famous Stories Retold') and many others.

From history stories to historical biography is a natural transition. This type of biography has been written for children since the middle of the 19th century, when the Abbotts, authors of hundreds of juveniles, popularized it. More recent examples — and naturally better ones — are Tappan's lives of Alfred the Great, William the Conqueror, Queen Elizabeth and Queen Victoria. Two excellent and very comprehensive sets of historical biographies (one in 36 volumes) are 'Life Stories for Young People' and the 'Children's Heroes Series,' the former translated from the German by G. P. Upton. Mention should here be made, too, of Marshall's 'Child's English Literature' for the abundant biographical material this well-written work contains.

Besides such special biographies, there are scores of others that are not necessarily historical or romantic. Good examples of such biographies suited to young readers are the 'Life, Letters, and Journals of Louisa Alcott' and Richard's 'Florence Nightingale.' Two excellent collected biographies are Mrs. Lang's 'Red Book of Heroes' and Mrs. Wade's 'Wonder Workers,' the latter dealing with eminent contemporaries.

Other kinds of instructive narratives that children like to read include every conceivable subject — from books of travel and geographical descriptions to animal stories and nature study excursions. Naturally, these cannot be enumerated here. A few good specimens of the types mentioned must suffice. Thus, 'Peeps at Many Lands,' 'Little People Everywhere,' 'Peeps at Great Cities' and 'The Little Cousin Series' — the last consisting of 40 volumes by various authors — are admirable travel books; such works as Burroughs' 'Birds and Bees' and 'Squirrels and Other Fur-Bearers,' Roberts' 'Kindred of the Wild' and 'Haunters of the Silences' — rather than the more romantic Seton stories ('Lives of the Hunted,' 'Wild Animals I Have Known,' etc.) — represent the best type of animal story; while Ball's 'Starland,' Morley's 'Insect Stories,' Thompson's 'Water Wonders Every Child Should Know,' Andrews' 'Stories Mother Nature Told Her Children' and Buckley's 'Fairyland of Science' —every one combining science and narrative in happy proportions — will serve to indicate the diversity of nature-study narratives, the best of which are as fascinating as fairy tales.

Children's Poetry.— It is common knowledge that a child's first appreciation of verse depends largely on rhythmic quality — hence his great fondness for the old Mother Goose rhymes, those matchless specimens of perfect rhythm. For the same reason children of fairy

tale age readily catch the swing of ballads, which they greatly enjoy even when the meaning of these vigorous poems happens to transcend their understanding. Among the best old ballads are 'Adam Bel,' 'Chevy Chase,' 'Sir Andrew Barton,' 'The Battle of Otterburn,' 'Fair Rosamond,' 'Sir Cauline,' 'The Heir of Linne,' 'The Blind Beggar's Daughter,' 'Clym of the Clough and Wyllyam of Cloudeslee,' and the cycle of Robin Hood poems. Good collections of such ballads are available in Bates' 'Ballad Book,' Mabie's 'Book of Old English Ballads' and Lanier's 'The Boy's Percy.' A special collection of the Robin Hood series has been made by Perkins ('Robin Hood'). The great popularity of these old ballads does not suffer even when their tales are retold in prose, which has been done repeatedly — best perhaps by Pyle ('Merry Adventures of Robin Hood') and Tappan ('Old Ballads in Prose'). For older children there are, in addition, the more modern ballads of Scott, Coleridge, Wordsworth, Browning, Tennyson and others, which are well represented in Palgrave's 'Golden Treasury,' 'The Oxford Book of English Verse' and almost any comprehensive collection of children's poetry.

Didactic narrative poetry for children has been well written by the Taylor sisters, whose 'Original Poems for Infant Minds' has already been characterized; the Lambs, authors of those charming 'Tales from Shakespeare' and other excellent Juveniles; the Carys, authors of the delightful 'Ballads for Little Folk'; Dr. Hoffmann, author of the ever popular 'Slovenly Peter'; and many others. Lyric verse for young readers is equally abundant. William Blake, already mentioned for his beautiful 'Songs of Innocence,' and William Allingham, author of many natural and graceful lyrics, seem to have perfected this type of poem. Other children's poets of the earlier period are Christina Rosetti, referred to elsewhere, Mary Howitt, Celia Thaxter and Lucy Larcom (most of them represented in Whittier's excellent anthology, 'Child Life'). The children's verses of Robert Louis Stevenson, whose 'Child's Garden of Verses' has never yet been excelled, of Eugene Field and of James Whitcomb Riley — not to mention their numerous imitators — are distinctly reminiscent of childhood at play; their appeal is therefore quite as much to adults as to children. Romantic poetry, which appeals to children in adolescent years, has been written by Scott, Longfellow, Tennyson and all the other great poets. Much of it can be appreciated in later childhood. When the child's taste for poetry has grown to the appreciation of the best romantic poets, he no longer needs any special children's poetry. For anthologies of children's verse, the reader must be referred to the works cited in the bibliography.

Juvenile Fiction.— From Goldsmith's 'Margery Two-Shoes,' Day's 'Sandford and Merton,' and 'The Moral Tales' of Mrs. Edgeworth to such modern children's stories as 'Heidi,' 'Peggy' and 'Nancy Rutledge' — is a far cry indeed. Yet, everything in narrative form that marked this long evolution comes somewhere under the general head of juvenile fiction. Naturally there are many different types of children's stories — some writers enumerate no fewer than a dozen. For our present purpose, however, two broad classes will suffice: (1) Stories of Adventure, and (2) Stories of Character. But even so, it cannot always be determined accurately to which class a children's story really belongs, the two general types not being mutually exclusive — a good story of adventure may abound in delineation of character, and effective character stories are not necessarily devoid of thrilling narrative. The determining consideration will be simply the predominance of either of these elements in stories possessing both.

That the child's earliest interest is in the adventure story, the story concerned with events rather than with character, is shown by the undying popularity of the fairy-tale and wonder story as nursery literature. This interest naturally carries over into animal stories of the non-fable type, stories of travel and romantic tales of every kind. Perhaps the best romantic story for children who have just emerged from the cycles of Arthurian, Carolingian and other legend — those fascinating adventure stories that no reading boy or girl should miss — is the historical novel, in which the heroic side receives special emphasis. Famous novels of this kind suitable for young people include Scott's 'Ivanhoe' and 'The Talisman,' Dickens's 'Tale of Two Cities,' Kingsley's 'Westward Ho!' and Bulwer-Lytton's 'The Last Days of Pompeii.'

A very different kind of romantic story, one that may be styled unhistorical, originated in this country with Cooper's tales of Indian life and adventures on the sea. In his 'Leatherstocking Tales' to 'The Last of the Mohicans' and 'The Two Admirals' there is not a narrative that any normal boy — and Cooper is decidedly a boy's author — willingly skips, any more than he can abstain from devouring the tales of mystery by Jules Verne. The *genre* of romance originated by Cooper has been done by Captain Marryat, Mayne Reid, Ballantyne and many others, whose thrilling tales of adventure on land and sea continue to enchant boys to this day.

Differing more in degree perhaps than in kind are such children's classics of adventure as 'Treasure Island,' 'The Three Musketeers,' 'Mysterious Island,' 'The Slowcoach,' 'The Adventures of Tom Sawyer,' 'Kidnapped,' 'Captains Courageous' and 'Adventures of Billy Topsail.'

The juvenile character story may deal with school-life, the home and many other things. The forerunners of the modern school story, a very prolific brand of juvenile fiction, were Harriet Martineau's 'Crofton Boys' and 'Tom Brown at Rugby.' Unfortunately these masterpieces have not been often duplicated in recent times, when the average school story is apt to be devoid of characterization and interest. Among the best modern school stories are Vachell's 'The Hill,' Coolidge's 'What Katy Did at School,' Brown's 'The Four Gordons,' Richards' 'Peggy,' and, especially, the works of Arthur Stanwood Pier, who has written some of the best books of this kind.

The home story, a type as ill-defined as any other kind of children's story, includes such excellent things as Alcott's 'Little Women,' 'Little Men' and 'Under the Lilacs'; Richards' 'Hildegarde Series'; Pyle's 'Nancy Rutledge';

Ewing's 'Jackanapes,' 'Lob Lie-by-the-Fire' and 'Six to Sixteen'; Yonge's 'The Lances of Lynwood'; Martin's 'Emmy Lou'; and Howell's 'A Boy's Town' — to cite but a few of the thousand-and-one stories coming under the present classification.

Finally, there are numerous other varieties of juvenile fiction which are represented by such diverse genuine classics as 'Rebecca of Sunnybrook Farm,' 'The Prince and the Pauper,' 'The Story of a Bad Boy,' 'Mrs. Wiggs of the Cabbage Patch,' 'Jim Davis' and 'Betty Leicester.' These few titles of modern children's books indicate the great advance made in juvenile literature since the days of the Edgeworths, Thomas Day and the other early writers of so-called children's stories. With all that, however, and despite the fact that streams of juveniles are continually pouring from publishers' presses, there is still a woeful dearth of unexceptionable juvenile fiction, especially of realistic stories.

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DAVID A. MODELL.

CHILDREN'S PLAYGROUNDS. Special provisions made by progressive modern communities, through public or private agencies affording children better opportunities for free or directed play. Socially and educationally, the children's playground movement is but a phase of the general Child Welfare Movement (q.v.) which began with the great awakening to the special needs and interests of childhood in the closing decades of the last century.

History.— Like many other great movements, the playground movement in America began very simply and unpretentiously. Boston was its first home, and «three piles of yellow sand» placed in the yards of the Children's Mission in 1886, its first concrete manifestation. This Boston idea, borrowed from Berlin, had little to do, however, with the subsequent development of the playground movement in the United States, which did not really begin before 1898. The earliest playgrounds were opened mostly under private auspices — charitable or philanthropic societies, especially social settlements — and to Brookline (Mass.) belongs the honor of taking the first municipal action on the purchase of playground sites (1872). In 1887 both Pennsylvania and New York enacted State legislation on the subject of playgrounds. Chicago established her first summer playground in 1892; Boston officially joined the movement in 1898, and the first municipal playground in New York was opened a year later. This last proved so successful that in 1903, in response to popular demand, similar playgrounds were established in other congested parts of New York city. The movement received much additional stimulus from the action of the New York Department of Education, which in 1898 took over a number of private summer playgrounds and placed them in charge of a special committee. Since then the playground movement in America has grown enormously. Numerous special societies devoted to playground interests now exist all over the country, and several national conventions, called by the Playground Association of America, have aroused world-wide interest. According to 'The Year Book for 1915,' published by the above-mentioned national association, no fewer than 460 cities maintained playgrounds in 1915 at a total cost exceeding $4,066,377 and with the help of more than 7,500 salaried directors or play leaders. The actual number of playgrounds in the United States the same year was 3,294, with 28 cities maintaining playgrounds unrecorded. In 1914 and 1915, 116 cities opened their first playgrounds. The rapid growth of the movement in intent has been equally significant, for at least 70 cities maintain special classes for the professional training of playground attendants and directors. Even normal schools and teachers' colleges now offer regular courses in playground supervision. The work is attracting great numbers of young men and women with talent for leadership and knowledge of child activities.

Management and Equipment.— In proportion as the educational and social importance of playgrounds becomes better understood their ownership tends more and more to pass from private associations to municipal agencies. But so great is the demand for additional playground facilities, especially in the larger centres of population, that both private and public ownership are apt to continue side by side for some time, as even together they cannot supply the ever-increasing demand—a demand so disproportionate to the supply that many cities have had to rope off streets at certain seasons for want of playground space. An idea of the number and relative proportions of private and municipal playgrounds may be formed on the basis of the figures given in the above-mentioned 'Year Book, which shows that in 1915, 182 cities supported their playgrounds by municipal funds, 112 by private means and 130 by both.

The tendency toward the municipalization of children's playgrounds, though unmistakable, cannot therefore be said to be very strong. Wherever such playgrounds are municipally owned, their actual management is placed in the hands of either the park department, the school board or some separate department specially created for the purpose.

The equipment of children's playgrounds, like their size and number, varies, naturally, with local conditions. The average school yard playground has a sand pit, a frame swing, a number of other swings and teeters, a spring-board, basketball standards, a standard for high jumping, a tether ball equipment, a net for volley ball and a supply of playground balls, besides special provisions for sewing, basket-making and raffia work. But many playgrounds have far more meagre facilities, which may consist of only jumping standards, horizontal bars and sand piles. The roof playgrounds, if for boys, make provisions for baseball, basketball and tennis; those intended for girls, however, will have little or no apparatus, as dancing and singing are their chief diversions on such playgrounds. The largest and best equipped playgrounds, such as are maintained by Chicago, include large fields for baseball, field houses, libraries, clubrooms, assembly-rooms, gymnasia, swimming and wading pools, etc. The broadest scope is given in such playground centres to play and social activities, which include singing, folk-dancing, story-telling, pageants and amateur theatricals.

The general tendency as to hours and seasons is to make children's playgrounds available during as large a part of the day and as many days in the year as seems possible. Some playgrounds, especially those located in parks provided with field houses, are open throughout the year. In 1915 there were at least 573 playground centres in 97 cities open all year round. Some, by electric lighting, are made available also in the evenings. The open hours of school playgrounds are naturally limited to non-instruction periods. The recent tendency, too, has been toward greater supervision and more trained leadership, experience having proved the unsupervised playground educationally undesirable.

Objects and Results.— The object sought by the promoters of the earliest playgrounds was very simple. It was merely to keep children off the streets and away from their physical and moral dangers. But as the playground movement developed its objects were interpreted more broadly. The importance of play as an educational factor coming to be more clearly understood, the formative influence of playgrounds on character and social ideals could not be overlooked. The connection existing between unapplied juvenile energy and waywardness suggests another very important gain from the playground movement, which has helped to make children not only busier but happier. Finally — to mention only the more significant benefits of playgrounds — children's playgrounds, by bringing together the various racial elements under the most favorable circumstances, exert a most salutary socializing influence upon America's cosmopolitan population — an influence making for greater comity and tolerance among peoples with natural or acquired animosities.

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DAVID A. MODELL.

CHILDREN'S THEATRES. The early educational plays, or, strictly, dialogues for children, under the severe pedagogics of the 18th and 19th centuries, were as near to the character of real plays as the shorter catechism is to roaring comedy. For certainly they contained no elements of play, the healthy demand of educationists of the present time. It is, of course, necessary to observe a distinction between the children's play written and played entirely «for fun» and the play written to meet some more or less diadactic purpose. In the bibliography below, the one will be found classed under «Home Plays» and the other under «School Plays and Pageants,» though the two may occasionally have a tendency to overlap.

In the mediæval ecclesiastical plays boys and young girls frequently took very important parts (consult Mantzius's 'History of Theatrical Art,' Vol. II, p. 88, for some curious facts); and 'Hamlet' has made everyone familiar with the boys of the chapel of the Elizabethan Court (consult 'The Children of the Chapel Royal and Their Masters' by John M. Manly, Cambridge History of English Literature, Vol. VI).

The first children's educational theatre on record, apart from 'School Drama' (see COLLEGE DRAMATICS), was, appropriately enough, in France. This theatre was built on her estate for the education of her children, by Comtesse de Genlis, who had been influenced by the nature theories of Rousseau. History, language and simple moral lessons were the subjects. The method was not far removed from the kindergarten system which also is, in principle, dramatic. For the rest, private theatricals at Christmas, and on other special occasions, carry us forward to our own times.

In 1903 in the Educational Alliance Building on the east side of New York, «The Children's Theatre» was founded by Miss Alice Minnie Herts, with Mrs. Sheridan Fry as director of plays. Miss Herts' book, 'The Children's Educational Theatre,' written after seven years' close experience, explains the reason of its origin, the enthusiasm with which the undertaking was supported, and the wide influence it has exerted. It also prescribes exactly how similar theatres can be organized all over the country. «The dramatic instinct,» says the author, «is a primitive impulse, not to be confused with dramatic talent, which is a specialized form of it. This instinct cuts a new and safe channel for a hitherto undirected stream of human energy. The demand of children for interesting entertainments is often met by nothing better than cheap vaudeville or moving picture shows.» Miss Jane Addams, in 'The Spirit of Youth,' also expresses the same; interweaving the delightful little character studies

of a close warm-hearted observer. Short stimulating essays on the subject, by Dr. Eliot of Harvard, Mr. Percival Chubb and Dr. G. Stanley Hall, are incorporated in Miss Herts' volume. This theatre, after many haphazards, is still in existence. In 1911 the Educational Players, a body of young amateurs, an offshoot from the Children's Educational Theatre, gave performances (generally free) in the public schools; and a few of their plays were written with these special school audiences in view. A 'Handbook of the Educational Player Method,' by Mrs. Sheridan Fry, is worthy of a classic place in the literature of pedagogy for the skill with which the author relates herself to the psychology of the child. The model rehearsal illustrated in the book is a work of fine art in its own way.

In 1913 the Educational Dramatic League was founded with Mrs. August Belmont as president and Mrs. Sheridan Fry as colleague. This powerful organization (a national, not a local body) is doing excellent work among the schools, and in the social, civic and recreation centres throughout the country. The League works co-operatively with the schools and centres; lending books of plays, costume plates, costumes and even sets of screens for backgrounds, for merely nominal sums to its members. It serves in some sort as a clearing house, introducing teachers or leaders, and holding classes to instruct school teachers and others how to direct their own plays.

The aims of the Educational Dramatic League are exactly those forwarded by Miss Herts and Mrs. Sheridan Fry when founding the Children's Educational Theatre, with the advantage of extended scope. The League does not encourage the making of actors, but seeks to guide the existing dramatic instinct of the child, for the profit of all concerned, both intellectually and emotionally. The visiting side of the work is being developed, and various charitable and other institutions gladly welcome the merriment that these youngsters are able to carry with them from outside. When cast for a part in a play a child refers to the history, geography and customs of the country or locality in which the play has been set, builds up the particular costume, studies the literary and elocutionary values of his or her part, to fit into the *ensemble*, and directly and indirectly absorbs many a lesson in an entertaining way, the work not being without its difficulties at every step. So that, far from the child lying in danger of finding itself drawn into the net of that fell disease, "stage-struckness," it has been very properly urged that our little hero or heroine receives such a foretaste of the difficulties of the actor's lot, robbing it of all glamour, that the experience proves an almost unfailing antidote — except in the case of either the elect or the incurable — not to be prevented or gainsaid under any system.

Nothing is more popular or more fruitful of good results in the settlement and neighborhood and recreation centres of the large cities than this dramatic activity of the children. In the Little Theatre of Hull House special productions of children's plays are given every year. The Boston Women's Educational and Industrial Union has established an association, "The Children's Players," organized from among college and private dramatic clubs. At the House of Play, a little theatre in Washington, D. C., the best plays for young people are regularly given by children for children, under the auspices of the Drama League. In such ways (and volumes of instances might be quoted) highest art appreciations are formed and the taste educated against inferior work.

Aside from the foregoing types of plays and playing, the readiest means found by children throughout all history for the expression of the dramatic instinct has been by dances, action songs and games. In the natural sequence these have, as times and occasions permitted, developed into the festival and the pageant. In the olden pastoral life of civilized, and even uncivilized peoples, it was usual for the young to join with the adults in the sports and pastimes of the festal days. The only concern the schools of organized communities had with these till lately was in the granting of holidays to the children. Then came the rise of machinery and factories, the spread of large cities and the consequent depopulation of the rural districts (particularly in Anglo-Saxon countries). With the introduction of these conditions the old-fashioned revels were gradually forgotten, and the natural instinct of the people for shows and showing was kept aflame only through spectatorship, fatuous and empty enough, for the most part. It could hardly be a matter of surprise that the sober-sided Puritans resisted these stupid entertainments, not realizing causes. But since it has been clearly demonstrated that there is no more refining influence than where the people of all ages are freely encouraged to play in common, especially where that play has a picturesque and emotional and intellectual tendency, our Puritan friends have been among the staunchest supporters of this community art. Meanwhile, it became the custom for the schools to initiate more or less formal celebrations on state occasions, on festal and commemoration days, and at the commencement or close of the school year. These, however, were only a little less severely disciplined than the regular lessons. John Ruskin, himself of Puritan Scotch descent, is said to have been the first to instigate a change from these methods in his suggestions for the revival of the ancient spirit of May Day. Since then the growth of the genuine festival cheer, both in and out of schools, has been in the ascendant. Commencement exercises and other such functions have partaken of the freer spirit of olden time revelry; and a wide appeal for the use of dramatics, even during lesson-hours, for the sake of a fuller and richer education, has met with pronounced success in Europe, the United States and the English colonies. Declamation, dramatization, singing, dancing, historical and fancy costume-making are now being treated as integral parts of the curriculum of the finer sort of school, where formerly these subjects were accounted mere "fads and frills," appropriate only for the overtime of worn-out teachers and pupils. Educationists of distinction are now generally of the opinion that the various branches of children's dramatics coordinate all other subjects (language, literature, history, geography, etc.), that they considerably augment young people's power of understanding all other lessons by visible and tangible aids and supply the fundamental test of all literature — the oral. Then, again, not only does the pupil

gain a lively impetus in his general work by study and rehearsal on his own account, but also by the spontaneous and often stimulating co-operation with other performers. At every point do the enthusiastic teachers descry some gain resulting from these methods, not the least gain being the world-wide demand for a more intellectual theatre, with which the children's dramatic movement has been concurrent.

Since the Ethical Culture School of New York, under the leadership of Mr. Percival Chubb, began experiments in communal dramatic forms some years ago, the practice has had great extension on all sides. The schools themselves have developed new types of festivals and pageants. The various training centres for teachers, the Boston Normal School, the Brooklyn Training School and the Teachers' Training College of New York have all made interesting experiments. These have had much direct and indirect influence on the children's performances and promoted many productions. The procession of the seasons, the anniversaries of the births and deaths of famous men and women in every field, the circumstance (and sometimes the pomp) of world events and innumerable other topics, as well as the time-honored festal days (Christmas, New Year's, Twelfth Night, Easter, Arbor Day, Fourth of July, Michaelmas, Harvest Thanksgiving) are being celebrated in most creditable performances in many schools and settlements; the tenor of these productions being likely to live long and happily in the memories of the young participants.

In 1910 eleven settlements in Brooklyn united in presenting the 'Pageant of Patriots,' showing the youth of various American heroes before an enthusiastic audience of 10,000 people. On 7 June 1914, under the auspices of the People's Institute and of Social Centre P. S. 63, the 'Festival and Pageant of Nations' was given in New York city. The folk costumes and much of the character and customs of the nations, of foreign peoples living in New York, were represented. Before a cheering crowd of 20,000 people 2,000 children and 1,000 adults gave this most successful performance.

For all manner of information toward making and shaping, spreading and showing every sort of play for young people, consult Miss Constance Mackay's invaluable guide, 'How to Produce Plays for Children,' written from the standpoint of the new stage art; also the works below.

Bibliography.— *Play Lists:* Whereas it was formerly necessary for thousands of amateur producers distant from the big cities to depend almost entirely upon textbooks, they have now the advantage of being able to consult two well-informed spirited institutions, the Drama League of America and the before mentioned Educational Dramatic League, New York, which is constantly making additions to a collection of printed and manuscript plays not to be found in the ordinary current lists of plays. Inquirers are also invited to address Miss Kate Oglebay, chairman of the junior department of The Drama League of America, at the New York and Chicago centres. The special pamphlet, 'Plays for Children,' contains many useful suggestions, a catalogue of useful books on costumes, reference books, etc., as well as classified lists of selected plays in English, French and German. Consult this pamphlet also for a list of 'Dramatic Readers' and dramatizations of school classics for all grades. Dramatizations by the children's classes of the Francis W. Parker School, Chicago, published at nominal sums, are interesting to teachers as exercises in story-dramatizing.

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DUNCAN MACDOUGALL.

CHILDRESS, Tex., town and county-seat of Childress County, 200 miles northwest of Fort Worth, on the Fort Worth and Denver Railroad. There are railroad repair shops located here. The waterworks are municipally owned. Pop. 3,818.

CHILDS, George William, American philanthropist and publisher: b. Baltimore, Md., 22 May 1829; d. Philadelphia, 3 Feb, 1894. He published the Philadelphia *Public Ledger*, 1864–94, which he made one of the first cheap newspapers in the United States. Under his management the *Ledger* attained a large circulation and wide influence. He educated over 800 children. He gave a Shakespeare memorial fountain to Stratford-on-Avon, a memorial window in Westminster Abbey to Cowper and Herbert and assisted in establishing a home for printers at Colorado Springs. He published 'Recollections of General Grant' (1885), and 'Personal Recollections' (1889).

CHILDS, Thomas Spencer, American clergyman: b. Springfield, Mass., 19 Jan. 1825; d. 21 March 1914. He was educated at New York University and at Princeton Theological Seminary. He entered the Presbyterian ministry and held pastorates at Hartford, Conn., 1851–66; Norwalk, Conn., 1866–70; Washington, D. C., 1882–90. In 1870–79 he was professor of biblical and ecclesiastical history at Hartford Theological Seminary and in 1880–82 was professor of mental and moral science at the University of Wooster. In 1890 he joined the Protestant Episcopal ministry and from 1894 to 1901 was archdeacon of Washington. In the latter year he became rector at Chevy Chase. He published 'Justification' (1861); 'Hints to Christians' (1862); 'The Heritage of Peace' (1868); 'Christ His Own Witness' (1880); 'The Voice of God to the Nation' (1901); 'Christian Unity and Church Unity' (1902); 'Mormonism and the Labor Question' (1904).

CHILE, chĕl'ā, or **CHILI,** chĭl'ĭ (the republic of), situated on the western coast of South America, between the Andes Mountains and the Pacific Ocean, is bounded on the east by Argentina and Bolivia and on the north by Peru. In length it surpasses even Argentina (q.v.), for it extends from lat. 55° 59′ S. to 17° 57′ S. in a curving line, the total length of which is nearly 2,700 miles, but its greatest width is only 248 miles, and in the narrowest part the measurement from west to east is less than 70 miles. The total area is 292,419 square miles. Besides the Andean Cordillera on the east, there is a parallel western coast ridge or cordillera with moderate elevations, and in the valley between the two, from Santiago, the capital, to the south, are found the best agricultural districts and many towns. Compared with the other South American countries, Chile ranks as the seventh in size. The northern part of Chile is a hot desert; the southern a cold region of almost incessant rains; but between these extremes lies a great extent of territory blessed with a temperate and healthful climate. Dividing the republic, for convenience of characterization, into five zones, in the northernmost zone, despite its nearly absolute lack of vegetation, are the chief resources of the national wealth — the deposits of nitrate of soda, mines, etc. The second zone, continuing toward the south, is less torrid. Rain falls several times in the year;

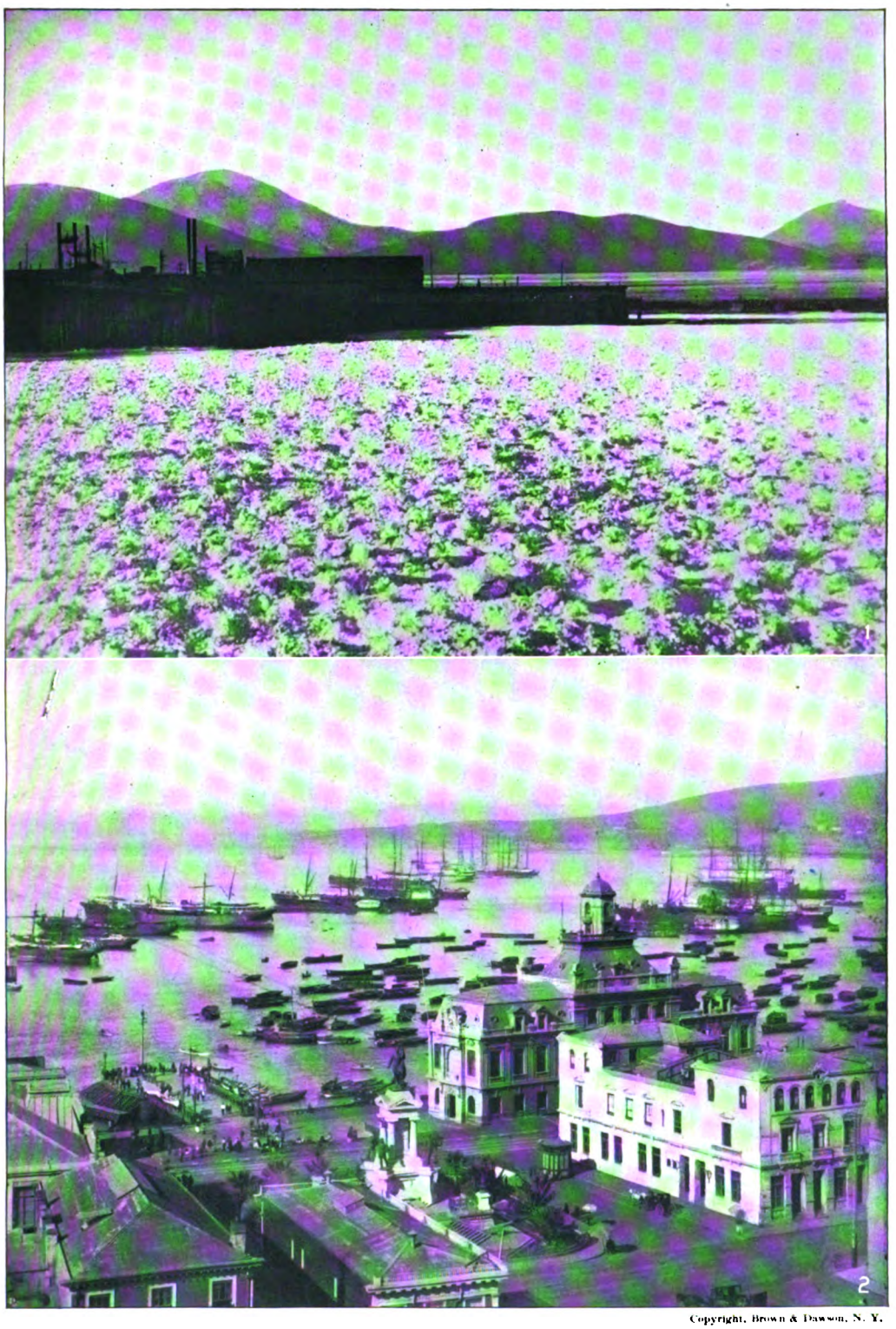
and though mining is the chief industry, small areas are also devoted to agriculture. The third zone, in the centre of the country, has a temperate climate and fairly abundant rains. Cattle-raising, mining and the cultivation of cereals, vines and fruits are the leading industries. In the fourth zone, where rains are more abundant and the climate cooler, the chief products are wheat, cattle and lumber. The fifth and most southerly zone, extending to Cape Horn, is cold and rainy. From 43° 30′ southward, about 1,150 miles is a district of islands and uplands, rich in forests, fisheries and lands suitable for stock-raising.

Physiography.— The country is a valley enclosed between two lines of mountains. On the east is the Cordillera of the Andes, diminishing in height to the south, where its line is crossed by various rivers and lakes. On the west a parallel, lower range, the coast Cordillera, is interrupted from about 42° S. lat. by many arms of the sea. It contains the line of islands that fringe the mainland. Chilean geographical contrasts and extremes are here illustrated. The Longitudinal Valley, admirably fertile between 30° and 42° S. lat., is prolonged in the arid desert of the north, but in the south is submerged beneath the ocean, becoming a drowned valley. The Cordillera of the coast is, geologically, older than that of the Andes. It is lower and less continuous, but so far resembles it that it presents, generally speaking, an abrupt slope to the west, while sinking much more gradually to the east. In Tarapacá it rises, almost from the sea, to heights varying from 1,000 to 7,000 feet. In Atacama it averages 3,000 feet, culminating in Peñarave (7,300 feet). Farther south it recedes from the sea and sinks in height till it disappears below Tres Puntas. It rises again to some 7,000 feet in the central provinces, notably in Roble and Campana, near Valparaiso. South of the river Ropel the range becomes lower and more complicated. Further south it splits into two parallel low spurs. South of the Bio-bio it is known as the Cordillera of Nahuelfuta. Still further toward the south it shares with the valley, its companion throughout, that plunge already mentioned; but its peaks and high plains form the line of islands clinging to the curved shore-line, though only at one point, the peninsula of Taitao or Taytao, is it visibly united to the continent.

Rivers that rise on the western side of the coast Cordillera form the smaller hydrographic system of the country; and the larger hydrographic system, the available source of unlimited power for industrial uses, includes rivers which have their source in the Andes and flow to the Pacific Ocean. North of lat. 28° S. all the rivers, except the Azufre of Tacna and the Loa, carry their waters to the sea only during a portion of the year. In the region just below this, to lat. 35° S.,— and particularly in the Valparaiso-Santiago section — are rivers swollen by the melting snow on the mountains in November, December, January and February and by rains that fall on their watersheds at another period. The more important of these annual floods is the former, which brings down into the agricultural valleys alluvial silt to renew their fertility. But below lat. 35° S. the rivers are subject to floods, especially in June and July, rather then than in the season from November to February, because the melting of snow on the mountains affects the total volume of water much less in these latitudes. Navigable rivers are comparatively few, and in any event they would be called upon to play a less important rôle here than that assigned to the great inland waterways of Argentina and Brazil, since the ocean itself facilitates communication with, or between, the different parts of this narrow country. The Andean rivers of the country rise at great altitudes and accomplish their descent to the coast by a series of cascades and great waterfalls, not at a single point or two, but in many widely separated regions.

Above the southern limits of the arid zones are saline depressions in lieu of lakes, although in remote ages, before radical changes of climatic conditions had occurred, the lake region embraced these northern districts. Lakes are still numerous in the south and are often found at imposing elevations. There are almost startling variations of temperature between the hours of sunlight and those of darkness, both at high places among the mountains and in the northern zones generally. The severity of winter's cold is confined to the Far South and the high Andes, snow never falling on valley or foothill north of lat. 36° S. The difference occasioned in climatic conditions by the cold current from the south that flows northward along the west coast is noteworthy. The mean annual temperature on the west coast, wherever the influence of this current (the so-called Humboldt current) is felt, is 6° to 7° F. lower than that of places in the same latitude on the east coast. The Humboldt current reaches Chiloé Island and thence flows northward to the equator. South of Chiloé, therefore, or, more exactly, from Taytao Peninsula southward, we find other climatic influences and conditions; and this statement applies to the entire territory of Magellan (Territorio de Magallanes) which, embracing nearly one-fourth of the total area of the Republic, extends along the Pacific Coast from lat 47° S. to the southern extremity of South America. On the southeast it is, indeed, separated from the Atlantic Ocean by outlying portions of Argentina; nevertheless the most important eastern outlet is secured to it by Chilean control of both sides of the Straits of Magellan. It has thus practically an outlook upon both oceans. The main divisions of the territory are the islands and channels north of the Straits of Magellan, up to the Peninsula of Taytao; north continental section, central continental section — region of Ultima Esperanza; south continental section — Chilean Patagonia — peninsula of Brunswick; western islands and channels of Patagonia; islands and channels south of the Straits of Magellan; Tierra del Fuego (Chilean portion); and the islands and channels south and west of Tierra del Fuego. The total area of the Territorio de Magallanes (66,861 square miles, almost equally divided between the continental part and the islands) is much greater than that of Rumania and only a little less than that of Uruguay. The 'Censo Jeneral del Territorio de Magallanes,' written by Lautaro Navarro Avaria, shows that the territory has received more immigration during the last few years than has been available for the development of other portions of Chile. A great majority of the immigrants were men who came to take part in sheep-

CHILE



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1 Nitrate deposit and Refining Plant, Northern Chile

2 Port of Valparaiso, Chile

raising and various industries, or who were attracted by not wholly trustworthy reports to the discovery of gold. The population at the date of the last census was only 23,650, 80 per cent of which was in the city of Punta Arenas and the town of Porvenir, and 20 per cent in the rural districts devoted to stock-farming. The climatic conditions are unfavorable to agriculture in the widest sense of the term, but sheep thrive uncommonly well on the immense pastures. The maritime traffic of Punta Arenas, despite its geographical remoteness, is very little inferior to that of Valparaiso, because its position on the Straits of Magellan makes it the port at which a thousand vessels — warships, merchant steamers, sailing vessels — call each year, to renew provisions or effect repairs of engines, or to spend a few hours waiting a favorable moment for passing the more or less dangerous points. See JUAN FERNÁNDEZ ISLANDS.

Flora and Fauna.—The essential characteristics of the Chilean flora were impressed upon it during the long ages of complete isolation, before the Argentine Pampas were lifted out of the waters that covered them. Even now the country is, on that eastern side, shut in by the Andean Cordillera, and on the north it is cut off from the rest of the continent by the deserts; formerly its separateness was like that of a Pacific island; and so naturally it is distinguished botanically by the large number of indigenous species peculiarly its own. Among these are two genera and five species of *Francoaceæ*, the *skylanthus*, and several species of *cactaceæ*. The potato is said to have come originally from Chile. It is still found wild in Chiloé and the adjacent islands and mainland. The bean and peppers are also indigenous, and maize and quinoa were grown in the country before the Spanish conquest. The forests of the Juan Fernández Islands, in so far as they have maintained their primitive character, may be classified with subtropical evergreens, because all their trees and shrubs, with the single exception of the michai (*Berberis corymbosa*) which shed its leaves in July and August, remain green throughout the year, thus showing adaptation to a temperate and uniform climate. Even a tree by nature deciduous, namely, the peach-tree (*Amygdallus persica*), retains its leaves all winter long when naturalized in Masatierra. Decidedly less noticeable in the fauna than in the flora are the insular or separate characteristics just referred to, although the fauna also differs from that of other South American countries to the extent of excluding jaguars (so common in regions just beyond the Andes), venomous snakes, monkeys, lizards (save in the northern zones) and river turtles. There are 12 genera and 25 species of rodents. In this order are included the beaver-like coypu and the chinchilla. Among carnivora we find the wildcat, puma and fox. Characteristic ruminants are the huemul deer and the small pudu (the latter peculiar to Chile), and those wild members of the llama family, the vicuña and guanaco or huanaco. Birds, great and small, are the condor, the white and the black albatross, pelican, giant petrel, penguin, rhea (South American ostrich), cormorant, the barking guid-guid, turco, tapacollo, gull, swan, duck, parrot and three species of humming-birds (one peculiar to Chile). Fish, comparatively rare in the rivers, abound in the ocean near the coast and in the channels of Magallanes Territory, and are taken in great numbers in the northern harbors. Chilean waters are also visited by whales and at least six species of seals.

Political Divisions and Cities.—The republic of Chile is divided into 23 provinces and the territory of Magallanes. In alphabetical order, with their areas and populations, capitals and populations, they are as follows:

PROVINCES	Area	Population	Capital	Population
Aconcagua	5,406	138,446	San Felipe	10,426
Antofagasta	46,408	126,101	Antofagasta	36,114
Arauco	2,189	63,209	Lebu	3,500
Atacamá	30,711	66,641	Copiapó	11,617
Biobío	5,353	103,873	Los Angeles	11,691
Cautin	6,381	172,006	Temuco	16,000
Chiloé	6,979	95,756	Ancud	3,979
Colchagua	3,851	159,930	San Fernando	9,150
Concepción	3,313	235,959	Concepción	69,776
Coquimbo	14,098	183,787	La Serena	24,000
Curicó	3,045	109,466	Curicó	19,529
Linares	3,969	114,980	Linares	11,122
Llanquihué	34,778	124,947	Puerto Montt	6,000
Malleco	3,303	117,375	Angol	7,896
Maule	2,812	122,754	Cauquenes	9,683
Ñuble	3,498	174,663	Chillan	39,173
O'Higgins	2,168	96,808	Rancagua	10,380
Santiago	5,893	587,721	Santiago	378,103
Tacna	12,590	45,593	Tacna	15,000
Talca	3,864	133,742	Talca	39,526
Tarapacá	16,689	123,843	Iquique	45,012
Valdivia	8,991	151,537	Valdivia	19,388
Valparaiso	1,775	324,660	Valparaiso	187,240
Magallanes Territory	65,355	22,744	Punta Arenas	11,000
Total (1914)	289,829	3,596,541	.....	.....

Population.— In 1907, the date of the last census, the population numbered 3,249,279, and in 1917 it was estimated as nearly 4,000,000. The great majority of the population is of European origin. The indigenous inhabitants are of three branches, the Fuegians, mostly nomads, living in the extreme south, the Araucanians (101,000), the ancient rulers of the country, who so long bravely resisted the white invaders, live in the valleys or on the western slopes of the Andes; the Changos, who inhabit the northern coast regions and perform most of the manual labor there. Immigration is small, but is encouraged by the government. The total number of immigrants between 1905 and 1914 was 25,544. Colonies (agricultural settlements) are encouraged and their number and importance are increasing.

History.— The dominion of the Incas of Peru included the northern and central portions of Chile — at least to lat. 37° S. In 1535 the Spanish conquerors of the Inca empire sent their first expedition southward along the Pacific Coast; but the task of adding this territory to the Spanish possessions in Peru and Upper Peru (Bolivia) was not undertaken in earnest until 1541; nor was it brought to a successful conclusion without desperate fighting in the second half of the 16th century. Pedro de Valdivia suffered defeat and death in 1553 at the hands of Lautaro, the young Indian leader, and not of the famous Caupolicán as many writers have asserted. Both Barros Araña and Errazuriz deprive Caupolicán of the glory that Ercilla first bestowed upon him. The Araucanians offered a stubborn resistance, and even as late as the 18th century they made

good their prior claim to a large part of the country below lat. 37° S.

In September 1810 was formed the first national government, to rule the country during the captivity of the king of Spain, whom the French held as a prisoner. From that time forward the design to achieve independence was never relinquished, though the events of the years immediately following were of a character to discourage patriotic aspirations. Chileans were defeated and compelled to return to a nominal subjection; the final success was won with the help of Argentine troops under General San Martin (see ARGENTINA), and the independence of the country was proclaimed in 1818. A constitution, adopted in 1824, and remodeled in 1828, was given in 1833 its final shaping, substantially the form which it still retains, though modifications demanded by the progress of the country have been made. Independence was recognized by a formal arrangement with Spain, and embodied in the treaty of 1844. In 1865, however, a war broke out between the mother country and Chile and Peru, hostilities continuing until 1869. After an interval of peace, the War on the Pacific began. For many years the rights of Bolivia and Chile, respectively, in certain mining lands bordering on the Pacific Ocean remained without definition; but in 1874 an agreement was entered into between the two countries which apparently disposed of the question at issue. The exploitation of these lands by Chileans increasing, Bolivia reopened the dispute by imposing an export tax on the nitrate, obtained in Bolivian territory. A Chilean company refused to pay the tax, alleging that it contravened the treaty of 1874. The Bolivian government's reply was an order for the sale by auction of the property of the offending company, on 13 Feb. 1879. Thereupon the Chilean government sent a man-of-war to seize the port of Antofagasta. It soon became apparent that Chile would be obliged to deal with Peru against whom a secret offensive and defensive alliance had been formed by Bolivia and Peru in 1873. On 5 April 1879 Chile declared war against the latter republic. Tacna and the neighboring port of Arica were occupied by the presidents of Peru and Bolivia with their troops; the defense of Iquique was entrusted to a sufficient force, and at Lima a reserve of about 10,000 men was held in readiness to meet the Chileans at any point that might be attacked. The plans of the allies seemed to have been well laid, and some initial successes fell to them. Two Chilean warships, the *Esmeralda* and the *Covodonga*, blockading Iquique, were attacked by the Peruvian frigate *Independencia* and the monitor *Huáscar*. The *Esmeralda* was sunk by the *Huáscar*, but the latter on 18 October fell in with the *Cochrane* and *Blanco* of the Chilean navy north of Point Mejillones. A fight of great severity ensued. Only 86 men were left alive on board the *Huáscar*, out of the complement of 216, when she was obliged to surrender. This vessel was repaired and added to the Chilean navy. Pisagua was captured from the Bolivians by Chilean warships. On 18 Nov. 1879, the allies were defeated in the battle of San Francisco, but before the close of the same month they scored a dearly bought success against the Chilean forces in the battle of Tarapacá. Chilean divisions commanded by General Baquedano invested the town of Moquegua, and on 23 March 1880 entered Torata. Two months later the city of Tacna (now the capital of the Chilean province of that name) was taken (26 May). The troops of the allies, including 5,120 Peruvians and 3,200 Bolivians, commanded by Admiral Montero, and the Bolivian President, General Campero, sustained a crushing defeat. Arica, the port of this district, was attacked by the land and sea forces of Chile in June, and fell after making a desperate resistance. In order to emphasize the defeat and to cripple the more important members of the alliance, the Peruvian coast was laid waste, Mollendo was destroyed, Callao and other ports blockaded and an expedition under Baquedano's command made ready to proceed to Lima. See PERU.

As the fruits of her victory, Chile took from Bolivia the districts of Cobija and Atacama; from Peru the coast line north of the Bolivian possessions to, and including, conditionally, the province of Tacna. Thus Chile's territory on the Pacific was extended northward from the old boundary, at lat. 24° S. One of the allies was cut off from communication with the outside world by way of the Pacific Ocean; and a strategic frontier was established against the other ally. A truce, instead of a treaty, was concluded between Bolivia and Chile after the war, the sentiment of the Bolivians being utterly averse to any permanent arrangement which did not give them access to the sea. Renewal of negotiations for a definite treaty, which should include the concession of a seaport, was repeatedly urged by Bolivia, but without effect. Peru, by the terms of the treaty of Ancón (1883), surrendered to Chile absolutely the valuable nitrate district of Tarapacá, but with respect to the Tacna-Arica region a peculiar convention was made. It was agreed that Tacna-Arica should be governed by Chile for a period of 10 years, and that, at the end of the decade, the vote of the inhabitants should decide whether it would be better for the province to revert to Peru or to be administered by Chile in the future — the country thus rejected by popular vote receiving from the other country $10,000,000 silver by way of compensation. Over 32 years have passed, and the Peruvian government has repeatedly urged fulfilment of the treaty, but the plebiscite has not yet been held. The regions that then changed hands now form the northernmost zone of Chile. The Bolivian frontier was settled by the treaty of October 1904.

Some of the amendments to the constitution referred to above were adopted before the outbreak of the war with Peru and Bolivia. They embodied the liberal ideas which, in 1874, triumphed over the conservation of the proprietors of large estates, a class practically dominating the government's policy up to that time. The most forceful of the liberal leaders who effected this important political change was Balmaceda, a member of Congress in 1868, Minister to the Argentine Republic at the time of the war with Bolivia and Peru, and, in 1885, elected to the presidency of the republic. Balmaceda's advocacy of measures relating to internal improvements, a system of popular education and the separation of Church and State, created bitter antagonism. United in opposition to him

were all those who disapproved of his vigorous liberalism on principle, and all who were jealous of his power as an individual. In 1888 the country was plunged into civil war. The operations of the forces of the revolutionists were directed by a junta representing Congress. The President assumed the powers of a dictator for the defense of his position; but he was defeated, and died by his own hand on 19 Dec. 1891. The opinion prevailed in Chile, when this conflict was at its height, that the United States government, through Minister Patrick Egan, was showing favor to the cause of Balmaceda, and discriminating against the Congressional party. The fierce resentment felt by the latter expressed itself in an attack upon sailors of the United States cruiser *Baltimore*, who became involved, while on shore, in a brawl with Chilean sailors. There was a riot of the populace in the streets, and several of the *Baltimore's* men were seriously or mortally wounded. When a report of this indignity reached Washington, suitable representations were made by the authorities there, but unfortunately it was necessary to address such representations to a merely provisional government at Santiago. The latter not only refused the demand for satisfaction, but insisted that the men who had been assaulted should be handed over to Chile for trial as criminals. The management of Chilean affairs was entrusted to President Montt, and the demand of the United States was emphasized by the sending of two additional warships to Chile. The new President tendered apologies for the discourtesy of the provisional government, as well as for the attack upon men wearing the uniform of the United States; and compensation was made to the wounded sailors, or to the families of those who had died.

Chile and Argentina had agreed that their common boundary should be a line running along the crest of the Andes, which was erroneously supposed to be the watershed throughout. Discovery of this error occasioned disputes at first, and finally a resort to arbitration. By mediation of the Ambassador of the United States, an agreement was reached as to the northern districts. The more intricate southern portion was surveyed by a boundary commission under Sir T. W. Holdich; and King Edward of England, as arbitrator, issued the award in 1902. On 28 May 1902, the plenipotentiaries of Chile and the Argentine Republic concluded two important agreements, the first of which provides for the arbitration of all questions not affecting constitutional precepts, or that cannot be settled by direct negotiations. It is entitled a "General Treaty of Arbitration," and the desire is expressed in its introductory clause "to settle by friendly methods whatever questions may arise between the two countries." The second agreement is entitled a "Convention on Naval Armaments," which has "the object of removing all causes of anxiety and suspicion." The two governments "renounce the acquisition of the war vessels they have in construction and the making for the present of any new acquisitions;" agreeing, moreover, to reduce their respective fleets until they arrive at "a prudent equilibrium."

On 25 May 1905 Señor Alejandro Lira signed the A. B. C. peace treaty at Buenos Aires. Diplomatic relations with Peru were severed in 1909 but no serious results ensued. On 10 July 1911 King George of England rendered his award in the long-standing Alsop claim, assigning $935,000 to the Alsop firm. The original amount of the claim was $3,000,000 with interest. Chile paid the amount 13 November through the government of the United States. In 1913 the railway from Arica on the coast of Chile to the Bolivian plateau was completed. The control of this railway is to be retained by Chile for 15 years, that is, until 1928. In 1915 Chile felt very keenly the effects of the Great War; the suspension of her credit in Europe, the loss of her export market and the obligation to secure her imports from new sources. Readjustment soon took place, however, and in some cases on a healthier basis. Bad credit practices have been destroyed; desirable retrenchment in public expenditures was in some cases enforced. Trade losses in one direction were made up in many instances by gains in other directions, and, in some cases, more natural routes and relations were established. Chile protested to Great Britain in 1916, against the destruction of the German cruiser *Dresden* by a British fleet in the territorial waters of the Juan Fernández Islands, and received an apology from the latter stating that the *Dresden* had not accepted internment and that it was destroyed to protect shipping. This apology was accepted by Chile. Germany protested to Chile, denying the allegations of the British note and demanding satisfaction. This protest was returned by Chile. (See LATIN AMERICA AND THE WAR). President Juan Luis Sanfuentes, representing the Liberal Democrats or new-Balmacedists took office 23 Dec. 1915.

Government.—The constitution of 25 May 1833 is still in force, though repeatedly amended. That fundamental law established for Chile a form of government, with legislative, executive and judicial branches, which at first sight appears to be genuinely republican; but the oligarchical tendencies are much stronger than in any other South American country. The legislative power is vested in the national Congress, composed of the chamber of senators, with members elected for a term of six years by direct vote and by provinces, in the proportion of one senator to each three deputies; and the chamber of deputies, with members elected for a term of three years. To represent Congress in the period of its recess, there is a permanent committee of 14 members, one-half chosen by each chamber. The President of the republic holds office for five years, and cannot be re-elected for the next consecutive period. A Council of State, composed of 11 members, some of whom are appointed by the President, and others by the chambers, has the power to intervene in certain appointments, and its consent is necessary for the promulgation of laws, the granting of pardons and some other matters. This council is not to be confused with the Cabinet, in which there are but six ministers or secretaries: the Minister of the Interior; of Foreign Affairs; of Justice and Public Instruction; of War and the Navy; of the Treasury; of Industries and Public Works. The judicial branch of the government comprises: the Supreme Court of Justice located at Santiago, and composed of seven members, with authority over all other tribunals of the republic; the Court of Appeals, for the districts

of Tacna, Serena, Valparaiso, Santiago, Talca and Concepción; one or more justices of the peace in each department of the republic; and sub-delegation of minor district judges. Juries exist only for suits involving the question of abuse of the freedom of the press. Senators must not be less than 36 years of age, and must have a fixed income of $2,000 a year. Deputies also must be not less than 36 years of age; and, they must be possessed of a fixed income of $500 per annum and, also like senators, serve without salary. Every married male Chilean of 21, or unmarried man of 25, not civilly disqualified by judicial act, is an elector. It is provided, however, that he must be able to read and write and must have a certain amount of property. The literacy test disfranchises considerably more than one-half of the possible electorate. This makes the members of the Congress the choice of a few electors. The President, who must be a native Chilean of not less than 30 years of age, is chief of the executive branch. He is elected by representatives who are themselves, by direct vote of the whole electorate, sent to a special congress for the purpose. The President is forbidden to leave the country either during his term of office or in the following year without sanction of Congress. His salary is $15,000 per annum. He is assisted in his duties by a Council of State of 11 members, five of whom he appoints, while six are appointed by the Senate. With the sanction of the Council of State, the President may convene extraordinary sessions. In the event of the President's death or abdication, the Minister of the Interior becomes Vice-President and chief of the executive branch. The President is, ex officio, chief of the army. The executive is represented in each department by a public prosecutor, who initiates civil and criminal prosecutions and is an officer dependent on the ministries of justice and of the interior. Limitations of the presidential influence and its subordination to the legislative power appear very clearly in the circumstance that the Cabinet must resign if it encounters an adverse vote in Congress.

Education.— In many parts of Chile education scarcely touches the common people; but, so far as the upper and middle classes are concerned, the educational system is fairly well developed. Elementary education is free, but not compulsory; and although there are schools of some kind in all towns, 75 or 80 per cent of the population as a whole must be called illiterate. The University of Chile in its various departments (including law, engineering, medicine, philosophy and the fine arts) has an attendance of 1,300. Other public educational institutions are the National Institute, with 1,200 pupils; Institute of Pedagogy; about 30 lyceums of secondary instruction for men; and 15 lyceums for girls; 6 normal schools; a conservatory of music; a commercial institute; also schools of fine arts, agriculture, arts and trades, for the blind and for deaf-mutes, professional schools for girls and industrial schools. Private educational establishments are numerous and receive pupils from other Latin American countries. The Roman Catholic University has courses of engineering and law. There are several museums of natural history and fine arts; an astronomical observatory and meteorological observatories; botanical gardens and, in various parts of the country, 41 public libraries, with 240,000 volumes. At Copiapó, La Serena and Santiago there are mining schools; and agricultural schools at Chillán, Concepción, Ancud and other cities. In 1916 the Chilean legislature voted to establish a school of mining at Antofagasta owing to the importance which that province has assumed in the exploitation of the mineral wealth of the nation; and with a view to training native engineers and to encourage the extensive study of the mineral resources of Antofagasta and promoting their exploitation. Exceedingly interesting are the statistics relating to instruction in Magallanes Territory, for it is shown that 77.77 per cent of all inhabitants of that territory, above the age of six years, can read and write; 1.89 per cent can read but cannot write; and only 20.33 per cent are entirely unlettered. But the percentage of illiteracy in Chile as a whole is, as we have just said, nearly four times greater. Comparing the Chilean population of Magallanes Territory with the foreign element, the former shows 25.51 per cent of illiteracy as against 13.23 per cent for the latter. A still more favorable result is obtained if we scrutinize the reports of primary and secondary schools in that territory. It appears that more than 83 per cent of all children of school age there can read and write, while less than 17 per cent must be classed provisionally among illiterates. The *Report* of the Commissioner of Education for the year ended 30 June 1915 (Washington 1915) contains the statement: "The budget passed by the Chilean Congress (for the year 1915–16), carries $122,450 (United States currency) for public instruction. This is less than 1 per cent of the entire budget and represents a mere fraction of the public expenditure for education, which is supplied mainly by the provincial governments." According to the latest annual of the Chilean bureau of statistics there were 3,131 public and 506 private primary schools in Chile at the close of the year 1913, with 318,000 and 61,000 pupils respectively; 16 public and 2 private normal schools with 2,650 and 225 pupils respectively; 86 public and 120 private secondary schools with 25,500 and 17,400 pupils respectively; 11 public and 10 private commercial schools, 3,660 and 1,690 pupils respectively; special schools of the army numbered 6 and there were 7 special schools of the navy. The cost of maintaining the public primary schools in 1915 was $2,945,310.

It is proper to note under this heading that the Spanish language, as written and spoken in Chile, differs from the standard Castilian in many respects. For example, the initial *g* in such words as *general* is changed to *j*. Compare in the bibliography the titles 'Historia Jeneral,' 'Censo Jeneral.'

Agricultural and Pastoral Industries.— The extent of lands capable of being utilized for agriculture is estimated at somewhat more than 146,000 square miles; but one-half of this is covered by forests and woods, a little more than one-eighth is properly pasture-land, and one-tenth irrigated areas or can readily enough be made productive by irrigation. About one-eighth of the total area of Chile may be classed as plains not requiring irrigation, and the soil has been built up by silt brought down in the flooding mountain streams. The main crops are

wheat, maize, barley, potatoes, rye, oats and forage plants. In the irrigated valleys of the north — in Tacna, Tarapacá, Atacama and Coquimbo — maize gives two crops annually. Other products are grapes, many of the subtropical fruits, tobacco, sugar-beets, honey and hemp. Vineyards exist from the northern extremity to Llanquihue. In the north, from Tacna to Aconcagua, the slopes of the irrigated valleys are clothed with the luxuriant green of the vines. And in these irrigated valleys, from Atacama to Chile's northern boundary, there are generous crops of figs, pomegranates and olives. Some of the Chilean tropical fruits are exceptionally fine. There is an immense grazing area in Magallanes Territory, near the Straits of Magellan; and sheep and cattle thrive in that part of the country. The horses bred in the central zones are short-bodied but powerful animals. Many conditions favoring agricultural development are present; but other conditions are very unfavorable. Nearly all the agricultural land of the Central or Longitudinal Valley, especially from Cautín up to Aconcagua, in the provinces of Valdivia and Llanquihue on the south and Coquimbo on the north, is in the hands of wealthy families of Spanish descent or others who have been "absorbed into the local oligarchy." "Although the law provides that land shall be divided up into equal shares among all children, a kind of patriarchal system prevails; and although a mansion or hacienda may shelter a group of families, the agricultural estates themselves are not split up. Consequently in these central provinces large estates are the rule." There is little modern enterprise; antiquated agricultural methods are still favored; leisurely and wasteful ways persist. Life on the haciendas is often very pleasant. Many of the houses are large, well built, delightfully equipped and money is plentiful. In the irrigated valleys of the north also much of the land is held by the ruling classes. There remain districts not yet absorbed for development, but the chief drawbacks of these are isolation, lack of transportation facilities and labor.

In 1913–14 the principal crops, with their acreage and production, were as follows: Wheat 1,018,382 acres, 8,787,852 cwts.; barley, 152,625 acres, 2,386,157 cwts.; oats, 121,615 acres, 1,267,815 cwts.; maize, 58,609 acres, 752,791 cwts.; beans, 76,188 acres, 737,626 cwts.; potatoes, 81,299 acres, 197,338 tons; vines, 162,902 acres, 45,981,056 gallons of wine. On 31 Dec. 1913 the live stock of Chile comprised 457,845 horses, 38,193 mules, 1,968,620 oxen, 4,602,317 sheep and 221,384 pigs. Dairy farms and the production of butter and cheese are on the increase. In Patagonia and Tierra del Fuego large tracts of country are devoted to sheep-farming.

The total wool production of Chile in 1916 was 20,000,000 pounds, more than twice that of Peru, the other great wool growing country of South America on the Pacific coast. As Chile does not export agricultural products to any great extent, the European War did not have a marked effect on the agricultural situation. In the latter part of 1914 the closing of the nitrate fields deprived the farmers in the south temporarily of a good market for their products, but a full and complete recovery was soon effected.

Labor.—A system of management which is a direct outgrowth of the conditions described in the foregoing section prevails on the large estates. A landed proprietor allows any farm laborer to take up as much land as he can till with the assistance of his family. He pays no rent, and the produce of the land is his own; but he has to sell his services to the landlord, whenever need for them arises, at less than one-half of the prevailing local rate. Thus a permanent supply of labor is secured by the landlord, and occasional employment by the laborer, or *inquilino*, as he is called (Lat. *inquilinus*, Sp. *inquilino*, tenant; compare *peón*, day-laborer). The *inquilinos* are obliged to work for the landlords at the time their own little farms need attention. The evils of the system are felt by both landlord and tenant, since the *inquilinos*, whose own farms are perforce under-cultivated by women and children, naturally render apathetic and inefficient service on the big estates. Contributory to the maintenance of such economically unsound arrangements is the character of the peasantry. There is a strong element of Indian blood (Araucanian, etc.) in the Chilean laboring classes generally; and although hardy and fairly hard-working, when well directed, they cannot easily be transferred from one place or occupation to another. They lack enterprise but have patience, when sober, and uncommon powers of endurance at all times. Professor Ross makes the assertion that the dominant class of landed proprietors in Chile was, as a whole, not averse to the perpetuation of the régime of paper money, under which the peso fell far below its former value; because when the peso depreciated farm wages did not rise in equal or corresponding degree, so the cost of labor to the hacendado or landlord was reduced by a substantial amount. Chilean laboring men are beginning, however, to have clearer ideas in regard to abuse of privilege. A general strike occurred in 1913, and a labor deputation visited the President of the Republic. The demands of the strikers included the redemption at par of the paper currency, the legal tender currency being worth only 20½ cents at the time; recognition of employers' liability for accidents and establishment of an eight-hour working day. The Chilean government has recently adopted measures of consideration for mothers working in factories. A special room is provided in factories where mothers may keep their children under one year of age, and may spend one hour of the working day in caring for them without any loss in wage.

The shutting down of the nitrate plants in the latter half of 1914 seriously affected over 50,000 laborers in the nitrate industries. The government was obliged to transport large numbers with their families to the agricultural districts where their presence served to depress the wage of the agricultural laborers. Early in 1915, the nitrate market greatly improved and the nitrate laborers were all returned to their own field of high wages. The employees of the manufacturing establishments of the central provinces also suffered severely in the first year of the war because the mills curtailed production. The miners were little affected by unemployment although employers complained of their inability to secure adequate currency for the payment of their men. The agricultural

laborers suffered least of all as agriculture was little affected and the war tended to raise the price of agricultural products.

Mining.— The deposits of nitrate of soda, or Chilean saltpetre (salitre), are in Tacna, Tarapacá, Antofagasta and Atacama, and their preservation is due to the rainlessness of those northern provinces. Measured from north to south, the deposits extend about 300 miles. Less than one-fourth of the total area of the salitreras has as yet been thoroughly investigated; but surveys of 2,242 square miles in that region, which was once the bed of an inland sea, were followed by the publication of the statement that 244,000,000 tons remained as a supply for the future. The annual exportation of salitre previous to 1915 exceeded 2,000,000 tons, valued at five-sixths of the entire export trade. But the exports of nitrate in 1915 were worth $77,981,158, as compared with $111,454,397 in 1913. The development was below normal for reasons stated under Banking and Finance. (See also *Commerce* — concluding paragraphs). In 1914 the exports of salitre fell to 40,147,463 quintals (of 101.4 pounds); but in 1916 it had risen to 64,781,125 quintals, or more than 3,000,000 tons, the largest in the history of the nitrate business in Chile. The revenue from the export tax on nitrates and iodine (a by-product of the extraction of nitrate from the raw ore) is more than two-fifths of the entire public revenue. The exports of nitrate in 1917 were less than in 1916 owing to lack of shipping facilities to transport the stock on hand. The Chilean government, on 16 April 1917, sold at auction large tracts of nitrate lands and purchases were made by 11 companies, three of whose bids amounted to more than $1,000,000 each. Only two of the tracts offered were not sold.

Next in importance are copper ores, which abound in the ancient cordillera of the coast and the lower slopes of the Andes in the central and northern zones. The copper output of Chile is increasing, owing to the development of large copper properties in which North American capital is invested. Copper exports advanced from $10,337,351 in 1913 to $15,143,802 in 1915. During 1916 Chile exported the largest amount of copper in her history, 120,756 tons as against 113,913 tons in 1915. This increase was due to the large output of the Churquicamate and Teniente mines. In 1917 the copper mines of Chile were being increased, enlarged and improved. Iron mines in the Coquimbo district are also being developed by American capitalists. Large quantities of gold were obtained during the first century of the Spanish conquest by the use of unpaid native labor. In the 18th century the output of silver was large enough to be, perhaps, misleading; for Chile is much less a land of precious metals or precious stones than the equatorial lands of South America; but, in addition to copper and iron, Chile has coal in various sections of the country. The principal mining centre is the coastal region south of the river Bio-bio, as far as the port of Lebu. Deposits have been found still farther south. The coal fields of the province of Arauco, it is estimated, contain over 1,800,000,000 tons. The coal mining companies have invested in this industry over $7,500,000 and now produce over 1,000,000 tons of coal per year. The product of these mines is from 10 to 20 per cent below the standard in the United States and Great Britain. Native coal is used in the factories at Lota and Coronel; on Chilean steamers and railways. The most interesting development of coal mining in South America is at Lota and adjoining regions in the province of Concepción. The territory of Magellan has no mineral resources that can be compared with those of the provinces of the north and centre of the republic. Veins of coal (lignite), not of the best quality, have for a number of years been mined at the Loreto, near Punta Arenas, and copper ores are obtained at Cutter Cove on the peninsula of Brunswick. There are washings of auriferous soils at some points in Tierra del Fuego and the Minas River; and calcareous and other salts exist. Mining is still in the initial stage in Chile. The number of work-people employed in mining in 1914 was 71,106, of whom 43,979 were engaged in nitrate of soda workings, 8,105 at coal mines and 11,142 at copper mines. Chile possesses rich iron mines, but the absence of good coking coal has been a great handicap to the iron industry. Plans were being made, in 1917, to use charcoal in the smelters, and Swedish and Belgian experts, familiar with the iron industry, were experimenting in Chile where good charcoal is abundant.

Antofagasta is one of the departments of Chile richest in mineral wealth. Alum, salt, sulphur, nitrates, aluminum, borax, carbonate of lime, chloride of sodium, cobalt, carbonate of soda, nickel and potassium are found in various parts of the district. One of the largest known deposits of low-grade copper is at Chuquicamata and is being worked by the Chile Exploration Company. Other extensive deposits exist at Caspana, Cerro Gordo, Conchi, Chacaya, Chug-Chug, Desesperado, El Cobre, Huacazul, Huanta-Jayita, Lagarto, Lomas Bayas, Mantos Blancos, Moctezuma, Naguayan, Nuevo Tamayo, San Lorenzo and a score of other places, some of which yield high-grade ores. There were copper smelters at Colama, Chuquicamata, Gatico, Antofagasta and several other places; and additional smelters were being projected in 1917. Iron, in various combinations, exists through the province; and mercury, blue vitrol, gypsum, tripoli and zinc among its unexploited wealth. The gypsum covers the desert plains over large areas.

Manufactures.— The more important industries of Chile, after the chemical and metallurgical, are those concerned with the manufacture or preparation of food substances, beverages, textiles, clothing, leather, woodworking (including furniture and carriage building) and pottery. In 1917 there were over 6,200 factories, employing 80,697 operatives, of whom 27,138 were women and 6,443 children.

Six Chilean concerns make china and glassware and the "Fabrica de Vidrios" (Window-glass Factory) and the "Sociedad Nacional de Vidrios" (National Window-glass Company), both in Santiago, employ over 2,000 workmen. The latter has a capacity of over 25,000 pounds of glass a day. The manufacture of plate glass was begun in 1917. Beer and wine bottles, demijohns and other heavy utility glassware are made by the "Sociedad Fabrica Nacional de Vidrios," which has a capacity of 36,000,000 bottles, which was (1917) sufficient to supply

the entire demand of the country. Several packing-houses had begun to carry on a profitable business in Chile in 1916, and in 1917 "La Compañia Frigorifica de Puerto Natales," with a capital of £100,000, and a capacity of 500,000 sheep a year, was under construction at Ultima Esperanza, in Magallanes Territory. All the refrigerator plants were paying dividends of about 100 per cent a year, so great was the rush of business caused by the European War. The annual consumption of paper and paper products in Chile was, in 1917, a little less than $4,000,000, of which over $3,000,000 was imported. The local product consisted principally of colored poster, cover paper, wrapping paper and cardboard.

There are more than 100 factories in Chile manufacturing ready-made clothing, underwear, shirts and waterproofs. A very large part of the output of these factories is sold in the local market as imported goods. The knitting industry developed greatly between 1900 and 1917. On the latter date there were 17 factories in Santiago alone. One cordage factory, "La Sociedad Industrial de las Andes", employed 350 hands in 1917 and was unable to supply the local demand. It was making an extensive propaganda to encourage the growth of hemp in Chile. The Santiago Lumber and Ship Company manufactures half the packing boxes in Chile and has a large output of shingles (1917). The European War called into being several furniture factories in Chile, and numerous establishments for the manufacture of food stuffs. Forty of these were represented at the Chilean Industrial Exposition opened at Santiago in September 1916; yet these were "only a small part of the food producing factories of the country." More than 150 factories are engaged in the making of alcohol, liquors, beers and other drinks; and about 40 in the manufacture of mineral waters. In 1915 there were 139 establishments in Chile turning out paper and paper products. Of these 99 also did a general printing and binding business and 12 conducted lithographing establishments. The cost of the maintenance of these factories was, in 1916, over $6,000,000. More than 90 per cent of the machinery used in the paper business in Chile is European.

The total number of factory employees is distributed as follows: Breweries, 4,225; glass and pottery, 1,053; food products, 12,068; gas and electricity, 1,208; shipyards, 1,034; clothing, 14,016; furniture and wood products, 12,393; building supplies, 1,365; textiles, 2,568; metal products, 6,880; paper and printing 4,731; leather and furs, 12,279; drugs and chemicals, 2,871; tobacco products, 1,735; carriages and other vehicles, 1,530; miscellaneous, 731; total, 80,697.

Tariffs.— Imports, being subject to specific duty or charges by weight (instead of ad valorem duty, as in the United States), may be dutiable on net weight, gross weight, weight including packing or weight including containers. No brief statement can summarize the various regulations prescribing the imposts on all classes of goods except those which, from motives of public policy, are admitted duty-free; but it is important to note that the application of a specific tariff results in the payment of identical duties on articles having the same name and general description, even though there may be a wide range of quality. To make this quite clear and to emphasize the difference between the Chilean practice in this respect and the practice in the United States, a concrete instance may be cited, as follows: Suppose two different articles, one worth $1,000 and the other $2,000, were imported into the United States. The duty, if calculated on an ad valorem basis of 40 per cent, would be respectively $400 for the first and $800 for the second. But if these articles should be imported into Chile, the duty would be assessed regardless of the difference in quality. The effect is to encourage the importation of costly articles. Consult Filsinger, E. B., 'Exporting to Latin America,' New York and London 1916.

Commerce.— In 1915 the value of Chile's imports from the United States was $17,800,611; in 1914, $13,627,618; and in 1913, $16,616,618. In 1913 the last normal year before the war in Europe, the figures for Chile's foreign commerce were: Imports, $120,274,001, exports, $144,653,312; Great Britain leading in both exports and imports, followed by Germany, the United States and France. Chile's principal exports were: Nitrate of soda, 2,666,000 tons (metric tons of 2,204.6 lbs. in this item and each of the following); copper concentrates, 69,106 tons; oats, 53,515 tons; wheat, 52,291 tons; borate of lime, 42,011 tons; copper, 37,712 tons; bran, 14,855 tons; iron ore, 14,100 tons; wool, 12,786 tons; beans, 10,840 tons; hides, 5,881 tons; wheat flour, 5,612 tons; whale oil, 3,109 tons; iodine, 437 tons. The 12 leading Chilean ports, whose rating is based upon the value of their imports, are, in the order of such rating: Valparaiso, Talcahuano, Antofagasta, Iquique, Resguardos, Valdivia, Punta Arenas, Taltal, Coronel, Tocopilla, Coquimbo and Correos. On the other hand, the 12 leading in exports take rank as follows: Iquique, Antofagasta, Mejillones, Tocopilla, Taltal, Caleta Buena, Valparaiso, Coloso, Punta Arenas, Pisagua, Junin and Talcahuano. The imports during 1914, as classified by the Central Statistical Office of Chile, were, with values in United States gold: Oils, varnishes, paints and coal, $18,478,181; textiles, $17,838,117; mineral products, $15,972,919; vegetable products, $14,161,999; machinery, instruments, tools and apparatus, $11,192,688; arms, ammunition and explosives, $8,639,150; animal products, $5,755,723; perfumery, pharmaceutical and chemical articles, $2,555,533; paper and cardboard and manufactures thereof, $2,467,004; beverages, $1,497,261; miscellaneous, $1,269,609. The effect of the European War upon Chilean commerce is described in the following paragraphs:

"The United States in 1915, for the first time, ranked first both in exports from and imports into Chile, receiving more than 42 per cent of Chilean exports and selling to Chile more than 33 per cent of the goods imported. Before the European War, the order of importance of countries in trade with Chile, both export and import, was Great Britain, Germany and the United States. But while the exports from Chile to the United States were $18,765,000 greater, the imports from the United States were $1,510,121 less in 1915 than in 1914. In other words, the increase in exports to the United States was greater than the total amount of imports from this source." (Supplement to

Commerce Reports, Annual Series, No. 41b, 10 Nov. 1916). In fact, the total imports from all countries showed a decrease of $42,538,977, while the total value of exports to all countries showed an increase of $10,179,052 in 1915 over 1914.

Currency.—Although Chile is nominally on a gold basis, the currency is inconvertible paper. Hitherto there has been no limit to the fluctuations in the exchange quotations, because there has been no fixed unit of value as a basis for rates. A theoretical unit does indeed exist, namely, the gold peso, representing 0.599103 grammes of gold .91666 fine, or, say, 0.54918 grammes pure gold, of which the par value in terms of currency of the United States is $0.365, and its equivalent in British currency, 18d. But this law is not in operation, and the actual circulation is composed of government notes which are quoted on the market at rates fluctuating between 18 and 25 cents per peso. In 1915 the rates fluctuated in the neighborhood of 7½d., thus showing a depreciation in the paper currency of about 25 per cent. The action of the government in authorizing its conversion office to issue notes against gold at a fixed rate of 12 pence per peso in 1916 indicates the possibility of the adoption of the gold exchange standard, in a manner analogous to that of Argentina (q.v.), Brazil, Mexico (in time of peace) and Panamá. The basis of exchange in Chile is the 90-day London bill, which is quoted in terms of pence per one paper peso (consult 'Latin American Monetary Systems and Exchange Conditions,' by Joseph T. Cosby, New York 1915, and 'Modern Foreign Exchange,' by V. Gonzales, 1914). Rates of exchange prevailing in Chile before the European War contrast with those prevailing in 1915, as follows: New York — sight — currency of United States — $1.00 = 5.06 Peso paper, on 7 Feb. 1913, but 6.64 Peso paper on 23 May 1915; London — 90 days — 10 1/32d. = 1.00 Peso paper on 7 Feb. 1913, but 7¾d. = 1.00 Peso paper on 23 May 1915.

Banking and Finance.—Banks with offices in Santiago or Valparaiso or both are Banco de Chile, Banco de Santiago, Banco Aleman Transatlantico, Banco Nacional, Banco Comercial de Chile, Banco Español, Banco de Chile y Alemania, The Anglo-South American Bank, Ltd., Edwards y Compañia, Banco Germanico de la América del Sur, London and River Plate Bank, Deutsche Sud-Amerikanische Bank Akt. Ges., Banco de la Republica, Banco Italiano, Banco Frances de Chile. Many have established branches. The Anglo-South American, with headquarters in London, has branches not only at Santiago and Valparaiso, but also at Punta Arenas, Chillán, Coquimbo, Copiapó, Serena, Iquique and Antofagasta. In the provinces we find, besides branches of the foregoing, The Banco de Concepción, Banco de Talco, Banco de Curico and Banco Comercial de Curica and Banco de Punta Arenas. The Banco de Chile is regarded as the official banking house of the government, though not strictly a government bank. There is, in fact, no government bank in Chile. Banking is carried out on rather more conservative lines than in most Latin countries. Interest is allowed on current and deposit accounts, and advances are made rather more freely than is the habit with English joint stock banks. With the German, Italian and Spanish banks there is a certain amount of co-operation of the home banks supporting the Chilean houses, which adds greatly to their strength and influence, especially in financing big commercial undertakings. During the first half of 1917 the depositors in the National Savings Bank increased 12 per cent over those of the corresponding period of 1916 and the deposits increased 17 per cent. The annual deficit in the national finances, which had become traditional, was changed in 1916 into a surplus. A government institution known as the Caja de Crédito Hipotecario lends, on lands and buildings, 50 per cent of their market value. A private concern called the Banco Hipotecario de Chile carries on a similar business; and, organized under the same law (that of 1857) are the private institutions Banco Garantizador de Valores and Banco Hipotecario de Valparaiso. The function of all four is, primarily, to assist agriculture by making loans on real estate for long terms. Savings banks in Chile are of relatively modern origin. In the course of 20 years deposits have increased more than 20-fold in their "cajas de ahorros," as they are called. Foreign banks, duly incorporated, may open branches in Chile. There is, however, at present a project of law requiring them to invest or maintain in Chile the capital they declare for use in that country, and limiting the deposits they can receive in proportion to such capital. There were, in 1917, six foreign banks doing business in Chile, each having many branches. A comparison of the financial movement during the year ending 31 Dec. 1914 with that for the previous year "shows that the European War caused"—such is the statement in a memorandum by Chile—"no impairment of the integrity of the banking situation, notwithstanding the fact that the foreign banks were constrained to remit to their home establishments the greater part of the funds that they had in the country." But it is necessary to place beside that statement another entitled "The Finances of Chile" in *The Americas* (Vol. I, No. 3), to the effect that the nitrate industry of Chile suffered perhaps more severely than any other industry of a neutral state, because approximately two-thirds of the nitrate exports before 1914 were taken by Germany and Austria-Hungary, and these, of course, were cut off; that the effect upon the general business situation was serious, and the government was a direct and heavy loser in its revenues. Fortunately the government had large gold credits in Europe. These credits are understood to have been accumulated for the purpose of establishing the currency system on a gold basis; but, inasmuch as they are available for discharging other government obligations, it seems probable that the gold standard will be postponed.

The total funded public debt, as shown by recent figures, amounts to $215,280,035, of which $173,644,000 is on account of external, and $41,640,035 internal, loans. The first public loan was for $5,000,000, raised in London in 1822. Others followed, and all were paid off. Then, from 1885 to the present time, Chile placed a series of loans, sometimes (as in 1889) on very favorable terms; and the acquisition of the nitrate fields, after the successful war with Peru and Bolivia (see above: *History*), placed

a vast source of wealth at Chile's disposal, enabling her to meet all requirements of the government, including the large increase in expenditures by the War and Navy departments; but this, unfortunately, did not prevent an excessive issue of paper. The annual expenditure approximated $70,000,000 gold in 1917 ($7,460,000 for the Department of Interior; $1,470,000 Foreign Affairs; $2,160,000 Justice; $6,800,000 Navy; $7,400,000 War Department; $5,280,000 Public Works; $15,400,000 government railways; $9,000,000 public debt service, etc.). The budget for 1918 is as follows:

Departments	Paper pesos	Gold pesos
Interior	44,155,000	446,250
Foreign Affairs	2,210,000	1,309,000
Justice	10,980,000	.....
Education	35,450,000	246,000
Treasury	18,804,600	39,560,000
War	42,590,000	251,500
Navy	20,816,500	4,216,000
Industry and Public Works	13,404,000	41,216
Railways	3,175,000	1,834
Total	191,585,100	46,071,800

With the gold at 36½ cents American money and the silver peso at 23 cents, this amounts to a total of $61,880,780, almost $8,000,000 less than the budget for the preceding year. In February 1917 the Chilean Congress authorized a loan of 20,000,000 pesos, $7,600,000, for the extension of railway lines and the improvement of the condition of those now in existence. The profits of the fiscal year 1916–17 were ordered to be applied to certain railway construction. Congress also appropriated 380,000 pesos ($130,870) to enlarge the Alameda station; and 400,000 pesos for construction of the Lingue — Pichilemu line. The budget provides annually for the development of water and drainage-systems in the chief cities and for the construction of port works, which will represent an outlay, when completed, of more than $26,000,000. The revenues and expenses of the country have increased in 20 years as follows: In 1894, income $25,945,000 and expenses $20,739,000; in 1913, the last normal year before the war, the fiscal revenue amounted to $77,575,000 and expenses amounted to $80,800,000; the budget for 1914 attained the sum of $95,520,000; in 1915 the fiscal budget was reduced to $63,362,000, approximately.

Transportation and Communication.—The Longitudinal Railway, with a total length of 1,957 miles, extends from Iquique to Puerto Montt, through the Longitudinal or Central Valley (see above: *Topography*) and with branches to the chief ports. Thus a double system of intercommunication, by both land and water, is maintained. Besides this central line there are three transandine railways and the independent lines of the nitrate fields — in all 4,521 miles. Other lines under construction increase the total to 5,684 miles (3,541 owned by the Chilean government and 2,143 miles privately owned). The Trans-Andean line, via Juncal, was completed in 1910. It connects Santiago, from Llai-Llai, with Mendoza, on the Argentine side of the Cordillera of the Andes. Another mountain-climbing line is the international railway from Antofagasta to Oruro and La Paz in Bolivia, a distance of 719 miles. A railway built by the Chilean government with the co-operation of Bolivia connects the port of Arica with La Paz. This road — a short line between the Bolivian plateau and the Pacific Coast, was opened to traffic in 1913. Steamship routes are, at present, still those which were followed in colonial days, although a single Japanese line crosses the Pacific. Between Panama and Valparaiso, with calls at all the larger ports, and occasionally at the smaller ones also, English, Chilean, and other lines maintain regular service at highly remunerative rates; and by the southern route through the Straits of Magellan come and go vessels of all maritime nations. Coastwise shipping gives employment to many Chileans. In the aggregate, the shipping of Chilean ports exceeds — and relatively to populations very greatly exceeds — that of other Latin American countries. There are, moreover, 21,000 miles of public road, 528 miles of navigable rivers and 660 miles of navigable lakes. The length of telephone line in operation is 44,000 miles, with 55,000 miles of wire. There are 17,497 subscribers. A chain of wireless telegraph stations was nearing completion in 1917. These are located at Arica, Antofagasta, Coquimbo, Valparaiso, Talcahuano, Valdivia, Puerto Montt, Punta Arenas, and one on the Juan Fernández Islands.

The telegraph service is chiefly performed by the State, which owns about 18,000 miles, with 367 offices out of the total of 22,500 miles. In the interest of public education, the government has made a practice of circulating newspapers, reviews and other periodical publications free of postal charges. The number of post-offices is given as 1,114, handling over 65,000,000 pieces of mail matter annually.

Army and Navy.—All males born in Chile, whether of native or foreign parentage, are, under the law of 1910, subject to compulsory service from the ages of 18 to 45; and the nominal strength of the permanent army is 23,216, of which number 17,132 are in the land forces. A system of military instruction and drill is enforced which practically renders a much larger number available in an emergency; the National Guard comprising all other men between the ages of 20 and 45. Plans for the army include three regiments of field artillery, two of mountain artillery, one section of machine guns, four companies of sappers and miners, six regiments of cavalry, 16 of infantry, and one battalion of railway troops, besides the administrative units. The war strength of the first line is estimated at 150,000 men. The artillery units are armed with Krupp guns (7 and 7.2 centimetre); the infantry with 7 millimetre Mausers. The police (about 500 officers, 1,000 non-commissioned officers and 6,000 men, organized on a military basis) are in charge of Santiago, the provincial and departmental capitals, etc. Establishments for military instruction are the Military Academy and school, cavalry school, artillery school, school for non-commissioned officers, and staff college, where higher studies can be pursued. The Chilean navy includes nearly 50 vessels of various classes: the armor-clads *Capitan Prat, O'Higgins* and *Esmeralda;* 4 protected or armored cruisers, 3 torpedo gunboats, 13 destroyers, 6 modern torpedo boats, 1 mine ship and 1 hospital ship. Two Chilean dreadnoughts being built in England were purchased for the British navy; and two submarines were

taken over by Canada. There is a naval academy at Talcahuano and a government naval school at Valparaiso.

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MARRION WILCOX.

CHILE SALTPETRE, or CUBIC NITRE, is nitrate of sodium, $NaNO_3$, which, however, is not really cubic, but crystallizes in very obtuse-angled rhombohedra. It is found in beds in the rainless district of Tarapaca, in Chile, where it occurs sometimes of great purity, but is generally mixed with other salts (one of which is iodate of sodium), and with sand and clay. These deposits cover more or less completely an area of more than 600 square miles. From the mines it is brought down by rail to the coast, and it is there transferred to ships, originally by means of rafts formed of inflated skins. The name of Chile saltpetre is a blunder. When the first cargo was taken to Liverpool, about 1830, its character was not known, and as it could not find a purchaser it was finally thrown overboard. The next cargo went to France, where its value was recognized, and ultimately quantities were brought to England. The demand for it has gone on steadily increasing. It is used either in mixed artificial manures, or alone as a dressing for grass, the bulk of which it is said to increase. It was anticipated that it might be used for making gunpowder, but the deliquescence of the salt has been found an insurmountable difficulty. It is, however, transformed into nitre by double decomposition with chloride of potassium, and large quantities are imported into Strassfurt, in Germany, for this purpose. It is, besides, substituted, whenever practicable, for nitrate of potassium as a source of nitric acid. The sole drawback to its general use for this purpose is the presence of chlorides, which, giving off hydrochloric acid, render the nitric acid impure. Of late the industry at Tarapaca has been greatly developed. The crude salt or "caliche," as it is called locally, is broken up and the nitrate concentrated by lixiviation with steam and boiling water. The liquor flows continuously from one tank to another gathering more and more of the salt till it has gained the desired strength, and it is then allowed to cool, and the nitrate crystallizes out. From the mother liquor, the world's supply of iodine is obtained.

CHILI MILLS, machines for pulverizing ore as a preliminary to securing the values. In these machines vertical rollers run in a circular enclosure or die. The rollers and dies are now usually of steel although stone is sometimes used.

CHILIASM, kīl'ī-ăzm, the belief that Christ will come to earth and rule the world from Jerusalem for 1,000 years. The Latin word millennium means the same thing. The Revelation of John is the chief authority of the Chiliasts. Papias, Justin Martyr, Irenæus, Tertullian and Lactantius were Chiliasts, but Origen was opposed to the notion. Papias, bishop of Hierapolis, says, in the millennium every vine will bear 10,000 branches, every branch 10,000 shoots, every shoot 10,000 sprigs, every sprig 10,000 bunches, every bunch 10,000 berries, and every berry 36 times 25 gallons of wine; and if a saint comes to pluck a berry it will cry out, "Pluck me, O saint; I am better for being plucked, praise the Lord." The Fifth Monarchy Men were, of course, Chiliasts, only they maintained that the Golden Age had begun, and that they were of it.

CHILKAT, chĭl'kăt, INLET, the western arm of the terminal part of the Lynn Canal, an inlet in Alaska, in about lat. 50° 10′ N. It is in the territory in dispute for a considerable time between the United States and Canada.

CHILKOOT, chĭl'koot, INLET, the eastern arm of Lynn Canal, an inlet in Alaska. It is again subdivided, its principal arm being called Taig, an inlet which stretches for 15 miles north and south in about long. 135° 20′ W.

CHILKOOT PASS, a pass over the mountains in the northern part of Alaska, traversed by thousands of gold-seekers in the Klondike gold fields' excitement in 1896–98. By way of the Chilkoot Pass is the most direct route to Dawson City, the principal starting point to the Klondike region. The trail starts from Dyea, along the river of that name, and crosses the

Pass at an elevation of 3,500 feet, to the head of Lake Lindeman, a total distance of 28½ miles. From the latter place to Dawson City is 548 miles. The Chilkoot Pass route is the old trail used for generations by the Indians, and for many years was the only one taken by miners and prospectors to reach the interior. It is by far the shortest route to the Yukon. The difficulties and dangers attending this route are many, and the steepness and roughness of the ascent have proved fatal in numerous instances, to those unaccustomed to endure hardships. The summit of the Pass is 13 miles from Dyea, the first six miles being traversed by a good wagon road. Owing to the winding of the Dyea River that stream had to be crossed several times by ford or ferry. The trail then enters a narrow cañon with steep, rocky sides, which it follows to Sheep Camp, four and a half miles farther on, which point is the timber line. From Sheep Camp to the summit the rise is from 1,800 feet in three and a half miles, to 1,000 feet in half a mile, and here masses of broken rock make the ascent, which is in some places almost perpendicular, difficult and hazardous. As a general route to the Klondike and to the country over the mountains Chilkoot Pass has been superseded by the railway through White Pass.

CHILLAN, chēl-yän', Chile, capital of the province Ñuble, about 56 miles northeast of Concepción. It consists of an ancient and a modern portion, the former built by the Spanish conquerors, who made it a place of some strength, in which the early settlers often found an asylum when hard pressed by the Araucanians. The old town was founded in 1579, and destroyed by an earthquake in 1835. The new town was built shortly after the latter date. It is regularly built and has a Franciscan missionary church and a normal school. To the southeast are sulphur baths, which were discovered in 1795, and to the east is the volcano of Nevado de Chillán, 9,528 feet high. Pop. 34,269.

CHILLED IRON, iron cast in metal molds called chills, where, on account of the rapid conducting of the heat, the iron cools more quickly on the surface than it would do if cast in sand. The effect of this chilling is to leave the interior of the casting soft and tough while the surface is hardened. This property of iron is taken advantage of by iron founders to harden specified parts of castings, those parts of the molds being of iron while the rest is of sand. It is used in making axle-boxes, hubs, plowshares and some hammers and anvils. The iron selected for making chilled castings should be entirely free from silicon which interferes with the hardening, and it should have a comparatively small content of carbon. Minute percentages of sulphur and manganese, on the other hand, contribute to the desired result.

CHILLIANWALLA, Battle of, an engagement in India between the Sikh forces in considerable strength, and the British commanded by Lord (afterward Viscount) Gough, fought 13 Jan. 1849. The Sikhs were completely routed, but the loss of the British was very severe: 26 officers were killed and 66 wounded, and 731 rank and file killed, and 1,446 wounded. The Sikh loss was 3,000 killed and 4,000 wounded. On 21 February, Lord Gough attacked the Sikh army, under Shere Singh, in its position at Goojerat, with complete success; and the whole of the enemy's camp fell into the hands of the British.

CHILLICOTHE, chĭl-lĭ-kŏth'ē, Mo., city and county-seat of Livingston County, on the Wabash, the Chicago, Milwaukee and Saint Paul and the Hannibal and Saint Joseph railroads, 70 miles east of Saint Joseph. It is a farming trade centre and has several manufacturing industries. It is the seat of the Chillicothe Normal School, State Hospital, State Industrial School for Girls and Saint Mary's Hospital, and is near the noted health resort, Laurel Mineral Springs. It has several daily and weekly newspapers, electric lights and street railroads, and five banks. Pop. 6,265.

CHILLICOTHE, Ohio, city, county-seat of Ross County, on the Scioto River, Paint Creek, the Ohio and Erie Canal, the Baltimore and Ohio Southwestern, the Norfolk and Western and the Cincinnati, Hamilton and Dayton railroads, 50 miles south of Columbus, the State capital, to which the Scioto Valley third-rail traction system gives trolley service. The city is the centre of an agricultural and coal-mining region; and it has flour, pulp and paper mills, foundries, the machine and repair shops of the Baltimore and Ohio Southwestern Railroad and numerous other local industries, banks, national and savings, trust, building and loan companies, and an active chamber of commerce. The United States census of manufactures for 1914 recorded 46 industrial establishments of factory grade, employing 1,758 persons, of whom 1,557 were wage earners, receiving annually $852,000 in wages. The capital invested aggregated $2,905,000, and the year's output was valued at $4,083,000; of this, $1,512,000 was the value added by manufacture. Public safety and public service, police and fire departments, both with motor equipment, parks, city hospital and Enderlin welfare home, are all administered under a mayor and city council. The public library, school buildings, churches, Masonic Temple, Elks Hall, auditorium, the Agricultural and Industrial Building, the well-kept homes and lawns, the broad and tree-lined paved streets are all characteristic of the "Old Town Beautiful," as it is called, and its residents. Chillicothe has an interesting history. In its neighborhood are several ancient mounds of prehistoric aborigines, and the sites of villages of the Chillicothe Indians, one of the four Shawnee tribal divisions, the latest of which was destroyed by Kentucky rangers in 1787. Chillicothe was settled in 1796 and here 1800–03 Gen. Arthur St. Clair set up his Territorial government, as governor of the Northwest Territory. It was incorporated in 1802 and following the agitation for statehood led by a quartet of the residents — Thomas Worthington, Nathanael Massie, Edward Tiffin and Duncan McArthur, it was here, on 29 Nov. 1802, that a constitution for the State was adopted, in compliance with the requirements of the Federal constitution, resulting in the young State's creation in the spring of the succeeding year, Edward Tiffin being elected first governor. From 1803–10 and 1812–16 Chillicothe was the capital of Ohio. When Ohio celebrated her 100th birthday as a State May 1903, it was peculiarly fitting that Chillicothe should have

been chosen as the place for the celebration, for all the historic memories of the early years of the State's existence cluster about this city. Again, 9 May 1912, the fourth Constitutional Convention of the State met here for one session as guests of the Chamber of Commerce. Pop. (1910) 14,508; (1916) 15,500.

CHILLIES, the fruits of the capsicum, used to make cayenne pepper, pickles and chilli vinegar. See CAYENNE PEPPER.

CHILLINGHAM WHITE CATTLE. See WHITE CATTLE.

CHILLINGWORTH, William, English Anglican divine and controversialist: b. Oxford, October 1602; d. Chichester, Sussex, 30 Jan. 1644. He was matriculated at Trinity College, Oxford, in 1618, and in 1628 was made a fellow of the same college. Having been won to the Roman Catholic Church through the arguments of the Jesuit Father Fisher, Chillingworth entered the English college at Douai, where Laud, then bishop of London, by correspondence implanted in his mind doubts regarding the foundation of the Roman Catholic system; and, resolved to make a thorough investigation, Chillingworth returned to England after a few months abroad. The result was that he declared for Protestantism and in 1634 set forth, in a treatise that was not published and is now lost, the grounds of his conclusion. Laud procured his nomination to a church benefice in 1635, but Chillingworth's scruples about subscription to the 39 articles and acceptance of the Athanasian creed was an obstacle that could not then be overcome. In 1637 was published his great work, 'The Religion of Protestants: a Safe Way to Salvation.' In the preface he explained away his former scruple about the 39 articles, and the next year was named prebendary and chancellor of Sarum. When Gibbon in his autobiography explains his own religious experiences, which closely resemble those of Chillingworth, he insinuates that the reconverted convert afterward repudiated privately the cardinal doctrines of the Church of England.

CHILLON, shē-yôn' or shĭl'ŏn, Switzerland, a castle on the Lake of Geneva, six and one-half miles southeast of Vevey, once an important stronghold of the counts and dukes of Savoy, and the prison-house of Francis Bonnivard, prior of Saint Victor, Geneva, from 1530 to 1536. It stands on a rock rising 22 yards from the shore of the lake, and is reached by a bridge. It probably dates from the 9th century. Bonnivard was confined in it by the Duke of Savoy because he had assisted the republic of Geneva, with which the Duke was at enmity. Byron's poem: 'The Prisoner of Chillon,' founded on this incident, has made it well known.

CHILOÉ', chē-lō-ā', Chile, province of, consists of the island of that name on the west coast, which is separated from the mainland by the narrow Strait of Chacao on the north and by the Gulf of Corcovado 30 miles wide on the east, and has a length of 115 miles, and an extreme breadth of 43 miles, and of a number of neighboring islets, mostly uninhabited; total area, 6,979 square miles; almost all Indians living on the principal island. Chiloé proper is hilly in the interior, and everywhere covered, except immediately along the shores, with nearly impassable forest. The climate is mild and not unhealthy, although inordinately wet. The Indians belong to a subdivision of the Araucanian family; they are a gentle and honest race, mostly engaged in fishing and in lumbering, timber being at present the chief export from the island, though immense deposits of coal have been reported. In the eastern part the soil is fertile and well cultivated. Corn, wheat, barley and hemp are produced extensively and domestic animals are plentiful. Oysters, which are very scarce elsewhere in South America, are found in large quantities in the Chiloé Archipelago. The potato here, as in other parts of South America, grows wild. The Spaniards discovered the archipelago as early as 1558. Chiloé was the last part of Spanish America under Spanish rule, which it was not rid of until 1826. The capital and chief seaport, Ancud, on the north coast, has a good harbor, is the seat of a bishop and has a population of about 3,979. Pop. of province 95,756.

CHILON, kī'lŏn, son of Damagetus and one of the so-called seven wise men of Greece. He flourished about the beginning of the 6th century B.C., and was a native of Sparta, and one of the Ephori, a body of magistrates which he is said to have originally introduced. A collection of his sayings may be seen in Orelli's 'Opuscula Græcorum sententiosa' (1819). Chilon claimed that the great virtue of man was prudence or a proper judgment as to coming events.

CHILOPODA, kī-lŏp'ō-dạ, a group of myriapods represented by the centipede (q.v.). In these animals the body is composed of from a few to between 100 and 200 segments; the body is flattened, and there is but a single pair of legs to each segment. There are three pairs of mouth-appendages,—that is, a pair of jaws succeeded by two pairs of accessory jaws; while the first pair of legs are modified to form the poison fangs, which contain at their base a poison sac, the ducts from which open by a minute pore, out of which the blood oozes when the creature bites. The *Chilopoda* are divided into four families,—*Lithobiidæ, Scolopendridæ, Geophilidæ* and *Scutigeridæ.*

CHILPERIC, chĭl'pĕ-rĭc, two Merovingian kings: 1. CHILPERIC I, king of Soissons from 561 to 584. He never was acknowledged king of all the Frankish land, but divided the kingdom with his three half-brothers; he had, however, great power throughout their dominions by reason of his influence with the nobles. The murder of his wife, Galswintha, involved him in a war with her brother-in-law, Siegbert of Austrasia. 2. CHILPERIC II, King of Neustria from 715 to 720. He was several times at war with Charles Martel (q.v.), but was forced to submit to him, and was in 719 made king of the Franks. Consult Sergeant, 'The Franks' (New York 1898).

CHILTERN HILLS, a range of flint and chalk hills in England, extending through Oxford, Hertford and Buckingham shires; loftiest summit, 905 feet. These hills were anciently covered with forests, and were infested by numerous bands of robbers. The steward of the Chiltern Hundreds is an officer of the

Crown, appointed to protect the people of Bucks from the robbers of the Chiltern Hills. This office is now a sinecure, but as a member of Parliament can only resign his seat by accepting office, he accepts this sinecure, which he immediately vacates for the benefit of others.

CHILTERN HUNDREDS. See CHILTERN HILLS.

CHILTON, Robert Hall, American soldier: b. Loudoun County, Va., 1817; d. Columbus, Ga., 18 Feb. 1879. He was graduated at West Point 1837; became captain of the First Dragoons, 6 Oct. 1846, and was brevetted major for gallant and meritorious conduct at Buena Vista, Mexico, 23 Feb. 1847. In this battle Jefferson Davis, afterward President of the Southern Confederacy, but then colonel of the First Mississippi Rifles, was severely wounded, and Chilton bore him from the field, a life-long friendship resulting from the event. He became a brigadier-general in the Confederate service, 20 Oct. 1862, was chief of staff to General Lee, and inspector-general of the Army of Northern Virginia. After the war he was engaged in business in Columbus, Ga.

CHILTON, William Edwin, American legislator: b. Saint Albans, W. Va., 17 March 1858. He was educated in public and private schools, by private tutors and at Shelton College. He has been engaged in law practice at Charleston, W. Va., since 1880; was admitted to the Supreme Court of the United States in 1891. He was appointed prosecuting attorney of Kanawha County in 1883, was chairman of the Democratic State Executive Committee in 1892, was secretary of State for West Virginia 1893–97 and United States senator for West Virginia 1911–17.

CHILTON, Wis., city and county-seat of Calumet County, 75 miles north of Milwaukee, on the Manitowoc River and on the Chicago, Milwaukee and Saint Paul Railroad. It has a large trade in the agricultural products of the surrounding districts. It has cheese manufactories, grain elevators, condensed milk factories, canning factories, machine shops, boiler works, flour mills, sash, door and blind factories. Pop. 1,600.

CHIMÆRA, kī-mē'-ră, a fire-breathing female monster reported to be of divine origin, brought up by Amisodarus, king of Caria. According to the description of her given in the Homeric poems, the fore part of her body was like that of a lion, the middle like that of a goat and the hind that of a dragon. She laid waste the fields of Lycia and all the country round. Hesiod says she had three heads, one for each of the three animal parts composing her body. She was destroyed by Bellerophon with the help of Pegasus. This mythical monster is supposed to have had its origin in the volcano of the same name, near Phaselis, in Lycia, round the top of which, according to popular belief, dwelt lions, round the middle goats and at the foot poisonous serpents. The word Chimæra early came to be used for a nondescript, unnatural production of fancy, a wild dream, owing to the strange, unnatural form of the being described by the poets.

In ichthyology, one of a family of oceanic, elasmobranch fishes, *Chimæridæ,* of primitive structures, a few species of which survive from Cretaceous and Lower Eocene time; noted for their extraordinary appearance. They are small, no living species exceeding three feet, have a shark-like body, heads furnished with strange fleshy projections, especially in the male, where they serve as "claspers;" or the snout may be extended into a sharp beak. The tail is continued into a sort of whip, often nearly as long as the body. One species is frequently caught in the North Atlantic, and others exist in the North Pacific and in the Japanese and South seas. Most of them inhabit deep water, where the young are born from eggs laid in leathery cases, like those of rays, on deep bottoms. Consult Boulenger, 'Fishes' (London 1910).

CHIMÆROIDEA, one of the primary divisions of fishes, the equivalent of *Holocephali* (q.v.).

CHIMANGO, shē-mān'gō, a carrion hawk of South America (*Ibycter chimango*), closely related to the Caracara (q.v.). The plumage is black, with whitish streaks on neck and breast in the adult, which are lacking in the young. Chimangos are particularly numerous in the Falkland Islands. Darwin describes them as without fear of man, frequenting inhabited regions and feeding on all kinds of refuse.

CHIMAY, shę'mā', Jeanne Marie Ignace Thérèse de Cabarrus, Princesse de, Hispano-French adventuress: b. 1773; d. 1835. She was the daughter of the Comte de Cabarrus, Minister of Finance in Spain. In 1789 she was married to the Marquis de Fontenoy, but was divorced from him in 1793, when she married the revolutionist Tallien. She induced the latter to join a plot for the overthrow of Robespierre, and was one of the chief promoters of the revolution of July 1794. Her husband became displeased with her social activity and freedom of manners and left her to join Napoleon's Egyptian expedition. They were divorced in 1802 and three years later Jeanne married the Comte de Camaran, later Prince de Chimay. She now settled down to a peaceful life. She was never admitted to court circles, although the first beauty of her time. Consult Houssaye, 'Notre Dame de Thermidor' (Paris 1866).

CHIMBORAZO, chĕm-bō-rā'sō or chĭm-bō-rā'zō, Ecuador, a peak of the Andes, in the province of Quito, lat. 1° 20' S. and long. 79° W. Though not the loftiest summit of the Andes, it rises 20,700 feet above the sea-level, and its top is covered with perpetual snow. The mountain has no crater, though it is built of volcanic rock. This mountain was ascended in 1802 by Humboldt and Bonpland, who, though they failed to reach the summit, yet mounted to the great height of 19,390 feet, a greater elevation than ever was before attained by man. Their further ascent was prevented by a chasm 500 feet wide. In 1880 the summit was reached for the first time by Mr. E. Whymper.

CHIMES. A set of bells from 3 to 12 in number, generally of considerable weight, tuned to the notes of the diatonic scale with sometimes one or two additional half tones. In England these are most often hung "free," i.e., so as to swing, and then are called also a "ring"

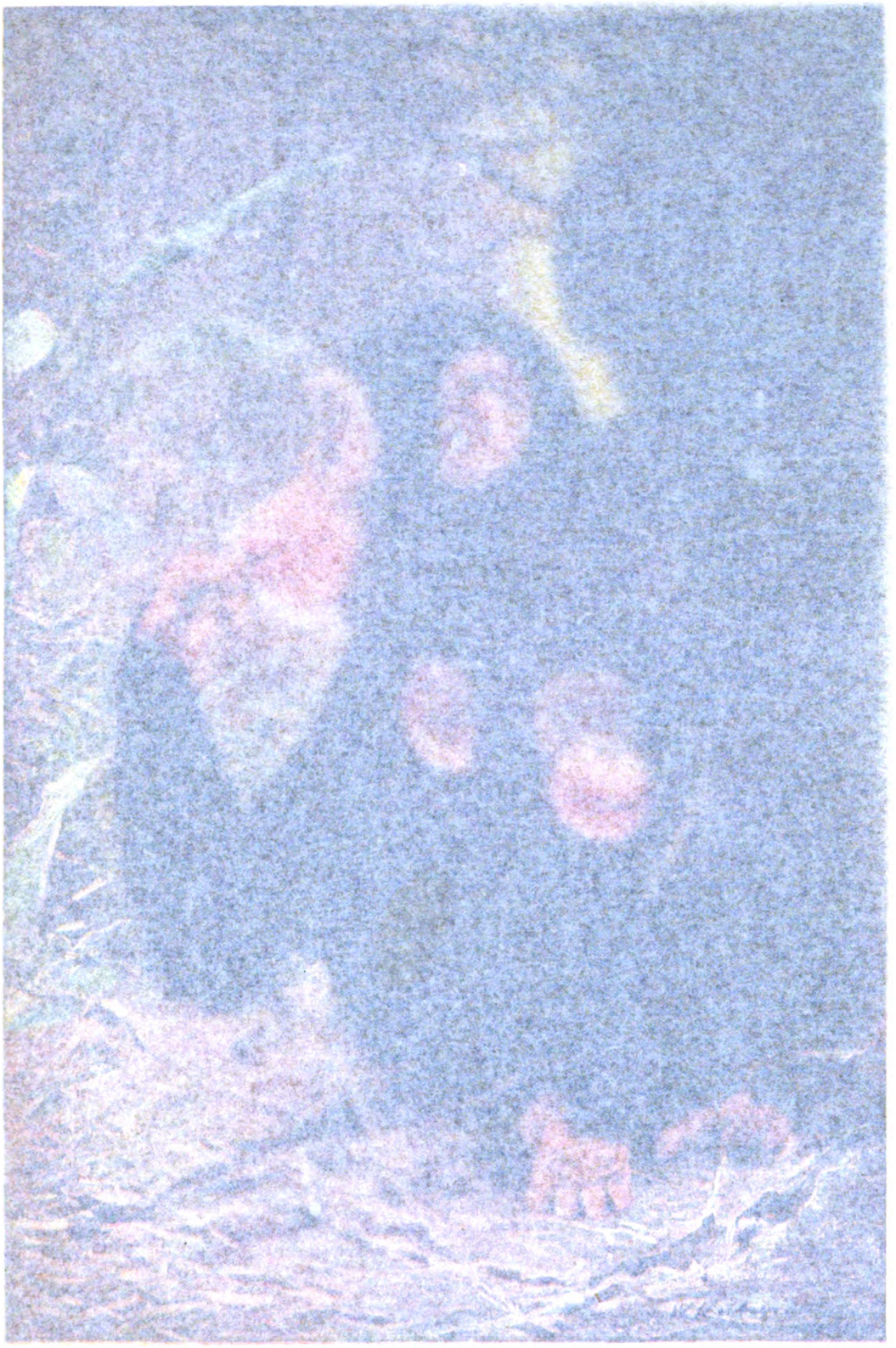
or "peal." A set of bells tuned to the chromatic scale, with a compass of three or more octaves and hung "fixed" or "dead," i.e., so as not to swing, is called a carillon. Tunes are played automatically on chimes where the bells are hung fixed and on carillons by a revolving drum and hammer mechanism like that of a music box. A chime hung fixed is also played by a chimer, who with his hands operates the levers of a chiming-stand, one lever for each bell. A carillon is also played by a carillonneur who uses both hands and feet on keyboards similar to those of an organ, connected with the clappers. In England a method of playing upon bells hung free, called "change-ringing," has long been in vogue. In this method each bell is separately swung by means of a rope by an individual ringer. The bells are thus made to sound one after another in mathematically defined changing sequences until they come back to the order in which they started. This in complicated changes often involves several hours of ringing. Great expertness is shown by companies of men in this art but the product of their skill is a regularly developed mosaic of sounds rather than music. On chimes only a few simple tunes can be accurately played. On a carillon, however, the chromatic characteristic combined as it is with the extended compass and range in the size of the bells — from several tons to a few pounds —enables the master of its keyboard to play not only the notes of a great variety of music but to interpret sentiment, and produce effects beyond the power of any other musical instrument. While England, because of its many bells, has been poetically called "the ringing isle," bell music has been still more a characteristic of Belgium and Holland and French Flanders through centuries. There carillons, and the great church and town hall towers which contain them, are maintained entirely at the public expense, and the bell music of folk songs, patriotic airs and national hymns, heard day and night and on market and feast days, is a considerable feature in the life of the people. Summer evening concerts in the Low Countries when the city carillonneur plays on the carillon clavier always have brought hundreds together to listen. Such concerts by Josef Denyn, the unrivalled master of the art, on the finest carillon in the world at Mechlin, Belgium, 45 bells, attracted thousands before the Great War. Antwerp's carillon then numbered 47 bells, Ghent's 52, Bruges' 47, Courtrai's 49, Mons' 47. In all there were recently about 70 carillons in Belgium and northern France. In Holland there are also about 70; among the finest are Middleburg, 41 bells; Delft, 40; Amsterdam (Palace), 37; Utrecht, 42; Arnhem, 47; The Hague, 37 and Appingedam, 25. Carillon destruction by Germany has undoubtedly been great. The bells of Ypres, 44; of Termonde, 40 and of Saint Peter's at Louvain, and of Arras are destroyed, and probably many or possibly all others in the occupied regions. The oldest chimes in the United States are those of Christ Church, Philadelphia; Christ Church, Boston; and Trinity Church, New York. California University, Berkeley, has 12 fine bells. Among English Carillons are Cattistook, 35 and Eaton Hall, 28 bells. In Ireland, Queenstown Cathedral has a carillon of 42 bells — the finest bells in the United Kingdom. Where chimes and carillons originated is not known. Tradition takes us back to the 12th century and the abbey of Egmond in Holland. But it is not until early in the 16th century that authentic records, principally in certain Low Country towns, appear. Louvain had 8 bells in 1525; Hoorn, 10, in 1528; Oudenburg 10, in 1539; Alkmaar 11, in 1541; Ghent 16, in 1543. Thereafter the development of this musical instrument was rapid. D. G. Rossetti, Thackeray, Stevenson, George Macdonald, Thomas Hardy, Victor Hugo, Georges Rodenbach, DeAmicis and others have written of carillon music. Longfellow's 'Belfry of Bruges' is especially well known. Consult Rice, William Gorham, 'Carillons of Belgium and Holland' (New York and London 1914, 1915); 'The Carillon in Literature' (New York and London 1916); Robinson, F. E., 'Among the Bells' (London 1909); Starmer, W. W., 'Royal Academy of Music Lectures' (London 1916); Van der Ven, D. J., 'De Torens Zingen' (Amsterdam 1917); Loosjes, A., 'De Torenmuziek' (Amsterdam 1917).

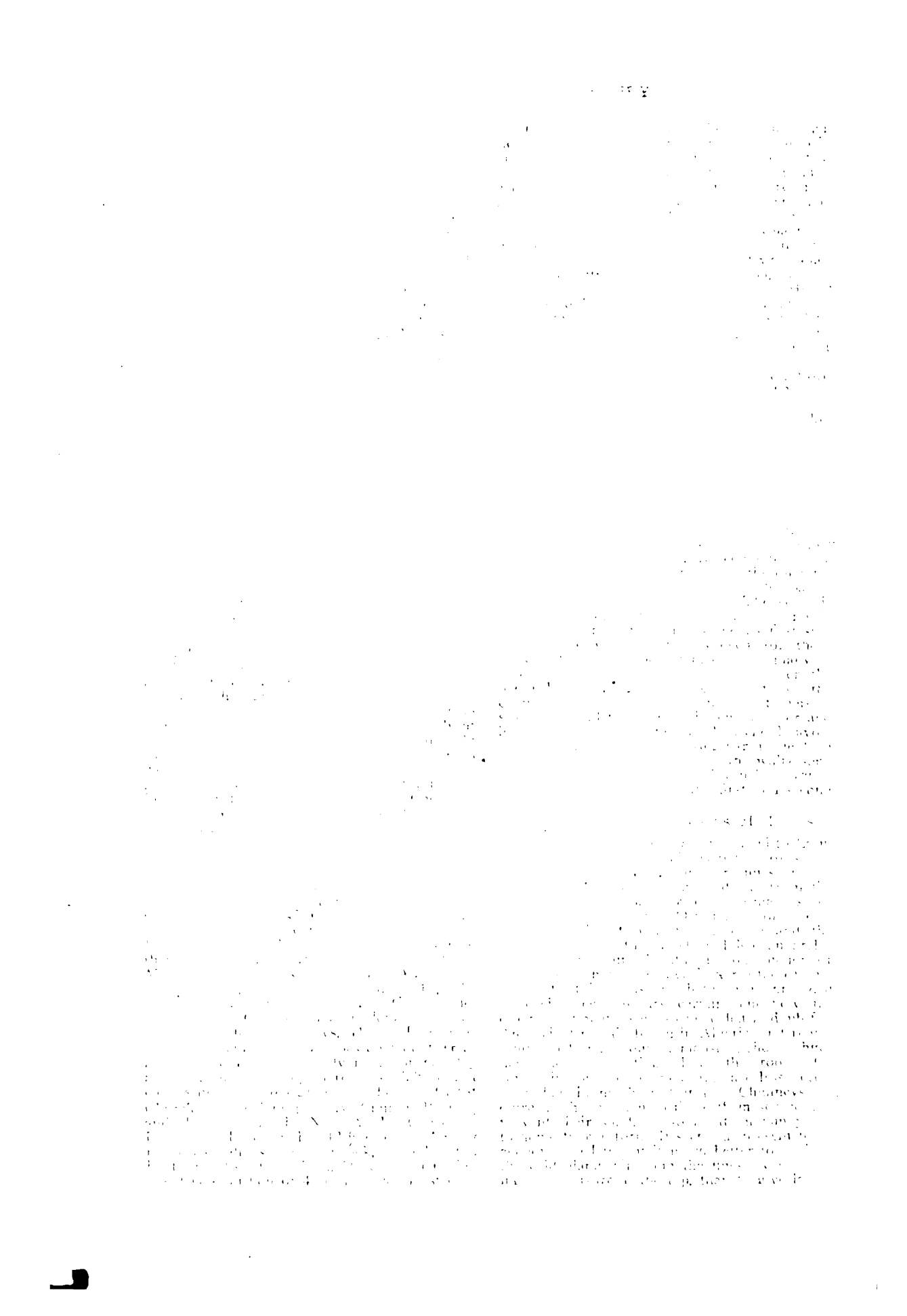
WILLIAM GORHAM RICE.

CHIMES OF NORMANDY, The (Les Cloches de Corneville), opera comique in three acts by Robert Planquette, libretto by Clairville and Gabet, first produced at Paris, 19 April 1877. While called an opera comique, 'The Chimes of Normandy' is rather in the operetta class, the most typical of which are Offenbach's famous series of *operas bouffés*. The story is simple and romantic, if not vital. The music is unaffected and spontaneous and its first success, which was conspicuous even for those days and for audiences which saw many a popular hit, has been repeated wherever the opera has been given. The legend of the chimes is the best known number, but there is scarcely a dull moment in the entire work and half a dozen of the songs are household favorites the world over. The lilting barcarolle, "On billow rocking," the cider song, the waltz song in the last act "That night I'll ne'er forget" and the spritely finales of the first and second act come readily to mind.

LEWIS M. ISAACS.

CHIMNEY (Fr. *cheminée*, related to Latin *caminus*, oven), an upright structure of stone, brick, etc., enclosing one or more flues or passages through which smoke and gas from the fire in a stove, furnace or fireplace may escape into the open air. Originally the term chimney included both the fireplace and the shaft. How far the Greek and Roman architects were acquainted with the construction of chimneys such as we have is a matter of dispute. That kitchens and baths were provided with chimneys appears certain, but how far other apartments were so provided is doubtful. An ancient mosaic found in Algeria, and representing a Roman country mansion, shows chimney stacks projecting above the roof. Of course in southern Europe fires are less necessary than in northern Europe. Chimneys require much attention to make them secure and prevent their smoking, so great an annoyance to domestic comfort. It seems at present to be acknowledged that it is much better to exclude the cold, damp air from the flues, by narrowing the aperture at the top, than to give larger





CHIMPANZEE (*Anthropopithecus niger*)

vent to the smoke at the risk of admitting a quantity of air to rush down the flue. For this reason chimney pots are of great use. The longer a chimney the more perfect is its draft, because the tendency of the smoke to draw upwards is in proportion to the difference of weight between the column of air included in a chimney, and an equal column of external air; and the heated air in the chimney being lighter than the external air, the longer the chimney is the greater is this difference. Short chimneys are liable to smoke, and fireplaces in upper stories are therefore more apt to smoke than those in the lower ones. Two flues in the same chimney should not communicate with each other short of the top. In manufactories tall chimneys are built for the purpose of carrying away the great quantities of smoke, which would otherwise be highly deleterious to the health of those living in the neighborhood. In chemical works, especially, these chimneys are sometimes built to an immense height. Such chimneys are constructed from the inside, by which the expense of the scaffolding is saved. The shafts of most early chimneys were round and the chimneys contained but one shaft each, from the side of which the smoke generally issued, the top being crowned. In France and Italy chimneys came to form a decorative part of the national architecture.

CHIMNEY SWALLOW, the common swallow of Europe (*Hirundo rustica*), so-called in Britain, where it makes its nests about buildings, and in niches of the outside of old chimneys, walls, etc. (See SWALLOWS). In the United States the name given erroneously to a very different bird, the chimney swift. See SWIFTS.

CHIMOIO, Africa, town in the Portuguese possessions, near the border of Mashonaland, 118 miles from Beira on the coast. A railway connects it with Fontesvilla, 28 miles northwest of Beira, and is being continued inland to Salisbury.

CHIMPANZEE, chĭm-păn'zē or chim-păn-zē', an anthropoid ape (*Anthropopithecus niger*), native to the equatorial region of Africa, from the Atlantic Ocean to the Nile, within a belt about 20 degrees wide. In this extensive territory it exhibits much diversity and has many local names, but whether these indicate more than one species is still to be determined.

This ape would measure in an average specimen about 5½ feet tall, but the spread of its arms and hands would be nearly 6 feet, and the girth of the chest about 35 inches. Old males often exceed these measurements, but there is not such a disparity in size between the sexes as in the gorilla. The massive structure of the bones and muscles implies great strength, but it certainly is not so prodigious as that reputed of the bigger gorilla. The forearm and hand are longer than in the other anthropoid apes (q.v.) except the gibbons, in conformity with the more arboreal habits; the skull is brachycephalic, the ears are proportionately large and stand out from the head, and the nostrils are wide. The skin on the face is naked and yellowish, surrounded by long black hair that hangs over the head and shoulders and depends from the elbows. The body is covered with shorter hair, typically shining black, but brown on the back in some specimens, especially those taken along the Ituri River in the Kongo region. In disposition the chimpanzee is milder and more timid than the always ferocious gorilla, and in captivity it is far more tamable than that irreclaimable beast, which is more primitive in every way.

Chimpanzees are forest-dwellers, and are not easy to find and observe, and still less to catch. They go about in family parties, probably mated for life and frequently gather into bands of two or three families. During the day their time is spent mainly in some big tree, dozing, nibbling at young shoots and "loafing" quietly. In the early morning and again late in the afternoon they descend to the ground and grab for roots and tubers, or search for fruit and the leaves of certain succulent plants of which they are fond. An intelligent traveler-naturalist, Major Cuthbert Christy, writing recently of his observation of these apes in the Kongo forests, says that where a large troop has been feeding one might believe a herd of real pigs had been at work. Much food is also gathered in the tree-tops, including fruit, insects and birds' eggs. The appetite for fruits makes the chimpanzee a menace to the plantations, especially when bananas are in edible condition. The natives guard the plantations, and as the animal is timid toward man this usually saves the crop; but when he cannot run away, the chimpanzee at bay is a formidable foe, using his long, sinewy arms and sharp teeth with deadly effect. He is even said to be a match for the leopard. The stories of his capturing and carrying off negro women or children are not substantiated.

The presence of chimpanzees in a neighborhood is quickly known to the people, "for at intervals during the day, either singly or in chorus, they indulge in bouts of far-echoing, half-human, half-maniacal shouts and hoots, rising *crescendo* to what seems like fiendish laughter . . . till the forest rings with the sound." Just at daybreak this forms a kind of concerted uproar that lasts for several minutes.

At night each adult climbs a tree, usually of small size, and by bending down branches and heaping leaves and twigs on them, constructs a platform big enough for a bed, on which he or she lies down and spends the night. These little platforms are believed to be used only once, and old ones are common sights in the forest; when the female is about to bring forth the one or sometimes two young, borne by her annually, she builds a similar platform-bed, and there the little ones are born and rest until able to travel or be carried away. The chimpanzees are so heavy that the big ones are clumsy in climbing about, as compared with smaller monkeys, and when in haste to make their escape from men, whom they will avoid and flee from whenever possible, they take to the ground. "At the first sign of danger," says Major Christy, "the wary old male forsakes his family, comes down from the tree-top with a few acrobatic swings and a drop, and makes off along the ground, not exactly on all fours, though something like it, using his great arms to help himself along, . . . to push swinging branches and creepers out of the way rather

than for running with. When on all fours his fingers are doubled on the palms of his hands so that he walks on his knuckles.» The arms are not so much needed or actually used for progression as has hitherto been believed.

Chimpanzees have been seen in menageries and zoological gardens in Europe since the middle of the 17th century; and many accounts have been given of their docility and submission to training, in which they exhibit an ability to learn to do things, and handle implements in a way that is most interesting and amusing. They also when young show much affection for kind trainers. They are very susceptible to diseases, especially of the lungs, and rarely survive long in captivity; and as they grow to adulthood they are likely to grow fretful, morose and even dangerous. Consult Hartmann, 'Anthropoid Apes' (New York 1886); Elliot, 'A Review of Primates' (New York 1912), and general works on natural history. See APE; GIBBON; GORILLA; ORANG-UTAN.

ERNEST INGERSOLL.

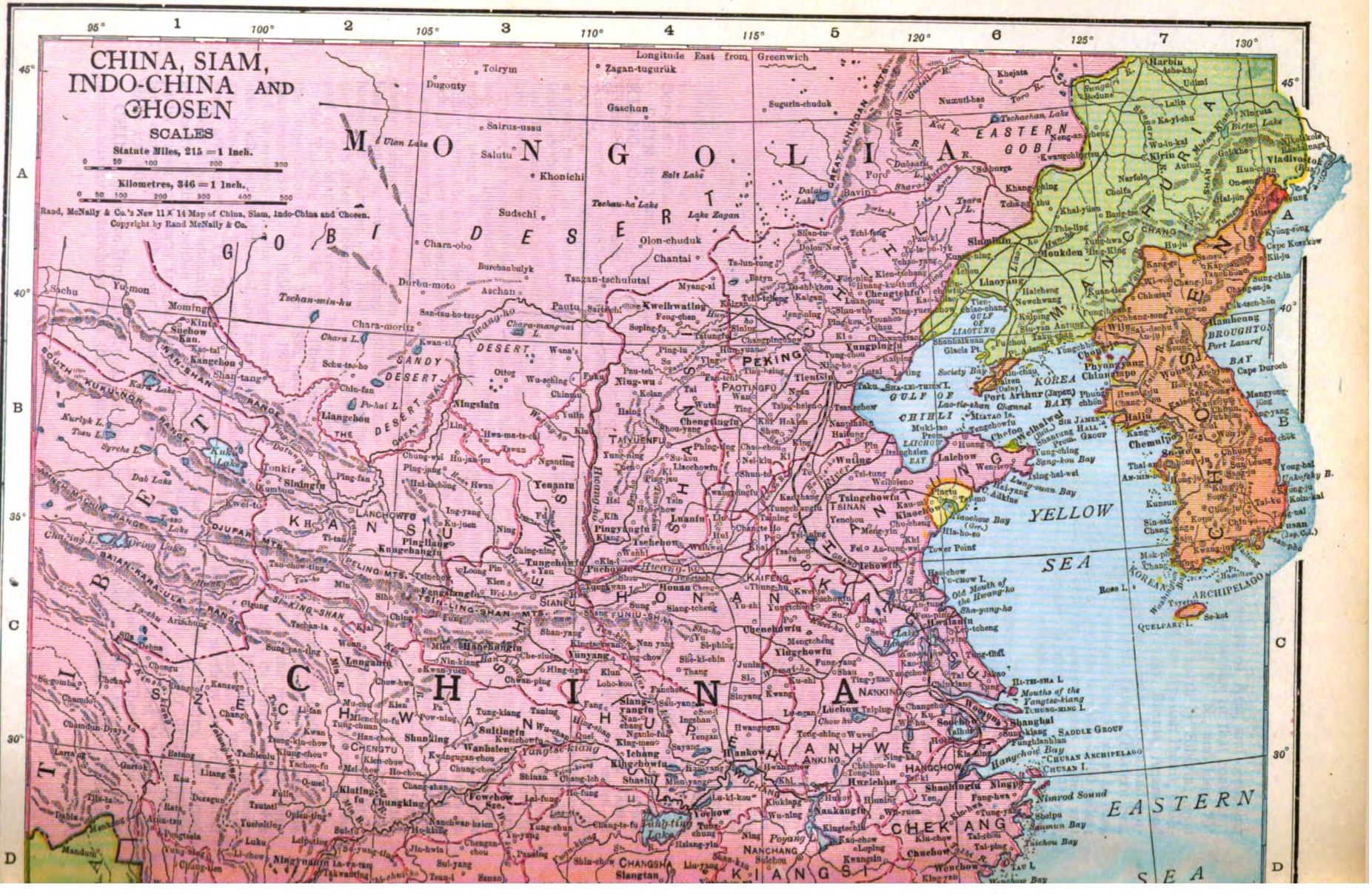
CHIN-FLY, a horse bot-fly (*Gastrophilus nasalis*) which has been confused with the horse-bot (*G. equi*). This species is smaller than the bot, densely hairy, with the thorax rust-colored. The abdomen is whitish at base and the wings are not spotted. It deposits its white eggs on the hairs about the lips or in the nostrils of equine animals, within easy reach of the tongue, and it is probable that the maggots hatch out more promptly than in other species. It has been found common and troublesome in Kentucky. Also, in Europe it is a parasite of the ass, mule and goat. See BOT-FLY; HORSE BOT-FLY.

CHIN-KIANG, chĕn-kyäng', or **CHIN-KIANG-FOO**, China, city in the province of Kiang-Su, on the right bank of the Yang-tse-Kiang, near the junction of the Grand Canal, 150 miles from Shanghai. In 1861 it was made a treaty port. It is advantageously situated for trade, as the river is navigable for large vessels, and the canal connects it with the country north and south of the great river, but with the construction of railroads the canal is about to lose its former importance. Extensive suburbs stretch along the river and the canal. Chin-Kiang forms the key of the empire, as the blockade of the river and canal at this spot would in a great measure prevent all communication between the north and south. The city was formerly fortified, but has been dismantled. It has a bund or river-fronting esplanade, clubhouse and churches. In 1842 it was taken by the British after a determined resistance on the part of the Manchu garrison. It was also taken by the Tai-ping rebels in 1853. They defeated the Imperialists here on 1 Jan. 1856, and finally abandoned the city in 1858. In 1889 a native mob destroyed half the foreign houses. Goatskins, silk, rice, hides, wool and fancy products are exported, and opium, cotton goods and sugar are imported. The foreign trade amounts to about $16,000,000 annually, the traffic having gradually declined within the last few years, partly owing to railway freights having entered into competition with river steamers. Pop. about 160,000.

CHINA (CHUNG-HUA MIN-KUO), an immense territory, stretching from the centre to the eastern extremities of Asia, and occupying nearly a third of the surface of that continent; between lat. 18° 20′ and 56° N., and long. 73° and 135° E.; bounded north by Siberia; west by Russian Turkestan, the Russian Pamir, Cashmere, etc.; south by India, Burma, Anam and the China Sea; east by Siberia, Korea and portions of the North Pacific Ocean (Eastern Sea, and Yellow Sea); greatest length, west to east, about 3,000 miles; greatest breadth, 2,400 miles; area, about 4,300,000 square miles. This vast territory is usually divided into China Proper, which forms its nucleus, and the following dependencies:

Manchuria (Chinese, *Tung-san-Sheng*) comprises the extreme northeast portion of the Chinese Republic. It is bounded on the north by the river Amur and Russian territory, east by the Russian maritime province, west by Mongolia, and south by the Gulf of Liao-Tung and Korea. It is divided into the three provinces Mukden, Hei-lung-Kiang and Kirin, the respective capitals of which are Mukden, Tsitsihar and Kirin. The total area is 280,000 square miles. *Mongolia* is the name given to the vast levels of desert land which, interspersed with infrequent oases, stretches across the greater part of the north of China along the Siberian frontier. A large part of its area of 1,288,000 square miles is taken up by the Gobi desert. The population is almost entirely nomadic. The chief town is Urga. *Eastern* or *Chinese Turkestan* is a mountainous region lying between the western tract of the Gobi desert and the Pamirs, and enclosed north and south by the ranges of the Tian-Shan and the highlands of Cashmere and Tibet. It possesses an area of 431,000 square miles. The principal towns are Kashgar and Yarkand. *Sungaria* or *Dsungaria*, the smallest of the tributary states of China, lies to the northwest of Turkestan, on the banks of the Ili River, at the junction of Mongolia, Turkestan and the Russian province of Semipalatinsk. Its area covers 147,900 square miles, and its population is said to amount to half a million. *Tibet* comprises the mountainous region lying between Turkestan and Nepal and Assam. On the east it adjoins China Proper, and on the west Cashmere. It covers an area of 651,500 square miles. Its capital is Lhasa. The authority exercised by the Chinese over their dependencies is by no means uniform. Some of the dependencies are closely connected with the empire, while others are merely tributary; and Tibet is so independent as to do little more than profess a nominal allegiance to the Republic of China.

CHINA PROPER (anciently *Cathay;* Chinese, *Chung Kuo*, "Middle Kingdom") forms the southeastern portion of the republic, and occupies less than a third of its whole extent. Not including the island of Hainan, it lies between lat. 20° 20′ and 41° N., and long. 98° and 123° E. China is bounded, north by one of the most remarkable of human structures, the Great Wall, which proceeds directly over mountain and valley, and for a length of 1,250 miles forms the barrier between China and Mongolia; on the west it is bounded by Tibet; on the south by Burma, Tonkin and the China Sea; and on the east by the North Pacific Ocean. There are


CHINA, SIAM, INDO-CHINA AND CHOSEN
SCALES
Statute Miles, 215 = 1 Inch.
0 50 100 200 300
Kilometres, 346 = 1 Inch.
0 50 100 200 300 400 500
Rand, McNally & Co.'s New 11 × 14 Map of China, Siam, Indo-China and Chosen.
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Longitude East from Greenwich
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MONGOLIA
GOBI DESERT
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CHINA
MANCHURIA
KOREA
YELLOW SEA
EASTERN SEA
GULF OF LIAOTUNG
GULF OF CHIHLI
KOREA BAY
CHIHLI
PEKING
TAIYUENFU
SIANFU
KAIFENG
NANKING
HANGCHOW
CHEKIANG
ANHWEI
HONAN
SHANSI
SHENSI
KANSU
SZECHWAN
HUPEH
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Toirym
Dugouty
Zagan-tuguruk
Gaschan
Suguin-chuduk
Sairus-ussu
Salutu
Khonichi
Ulan Lake
Salt Lake
Tschau-ha Lake
Lake Zagan
Sudschi
Olon-chuduk
Chantai
Chara-obo
Burchanbulyk
Durbu-moto
Aschan
Tsagan-tschulutai
Tschan-min-hu
Chara-moritz
Chara-mangnai
Chara L.
Sachu
Yu-mon
Moming
Kintschow
Kan.
Kao-tai
Kangchou
Schu-tso-ho
Chih-fan
Liangchou
Po-hai L.
Kurlyk L.
Tsau L.
Syrcha L.
Kuku Lake
Dab Lake
Tonkir
Sininguu
Kwei-te
Lanchowfu
Djupar Mts.
Ching Lake
Ching L.
Pinglang
Kungchangfu
Fengchangfu
Hanchungfu
Lungnanfu
Chow-hwa
Mienchow-fu
Chengtu
Kiating-fu
Chungking
Fowchow
Nanchwan-hsien
Ho-chiu
Chengan-chou
Jiu-hwa
Sui-yang-ting
Kwanghan
Shih-chow
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Tsunyi
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Li-chow
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Tsingchowfu
Tsinan
Yenchou
Mengyin
Tsaochow
Nanpiaotien
Hailoung
Wuting
Tsi-tung
Weihsien
Tsaochangfu
Tungchangfu
Kaochang
Kiaochow
Kiaochow Bay
Tsingtau
Tai-tsang
Lung-kuan Bay
Lai-yang
Laichow
Laichow Bay
Tower Point
Fei
An-tung-wei
Yen-chow I.
Old Mouth of the Hwang-ho
Sha-yang-ho
Boss I.
Quelpart I.
Se-kot
Hwai-an
Hwai-yuan
Hwai-ho
Hwai-ho
Yellow R.
Grand Canal
Yangtse-kiang
Mouths of the Yangtse-kiang
Tchung-ming I.
Saddle Group
Chusan Archipelago
Chusan I.
Hangchow Bay
Nimrod Sound
Shelpu
Sammun Bay
Taichow Bay
Tai I.
Wenchow
Wenchow Bay
Ningpo
Shaohingfu
Shanghai
Soochow
Wusueh
Changchow
Chinkiang
Yangchow
Taichow
Luchow
Liuan
Hwaiyuanfu
Pengpu
Yungchowfu
Chenchowfu
Honanfu
Hwaiking
Chowtsun
Yuchow
Kiukiang
Nanchang
Poyang L.
Kanchow
Kwangsin
Fai-chow
Kingtechin
Wu-ning
Hukow
Nankangfu
Kiu-kiang
Hwangchow
Anking
Tong-liu
Tong-ching
Wuwei
Ho-fei
Lu-an
Lu-kl-kou
Shashi
Ichang
Kingchowfu
Yochow
Tung-ting Lake
Changsha
Siangtan
Liu-yang
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Ning
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Yuan-kiang
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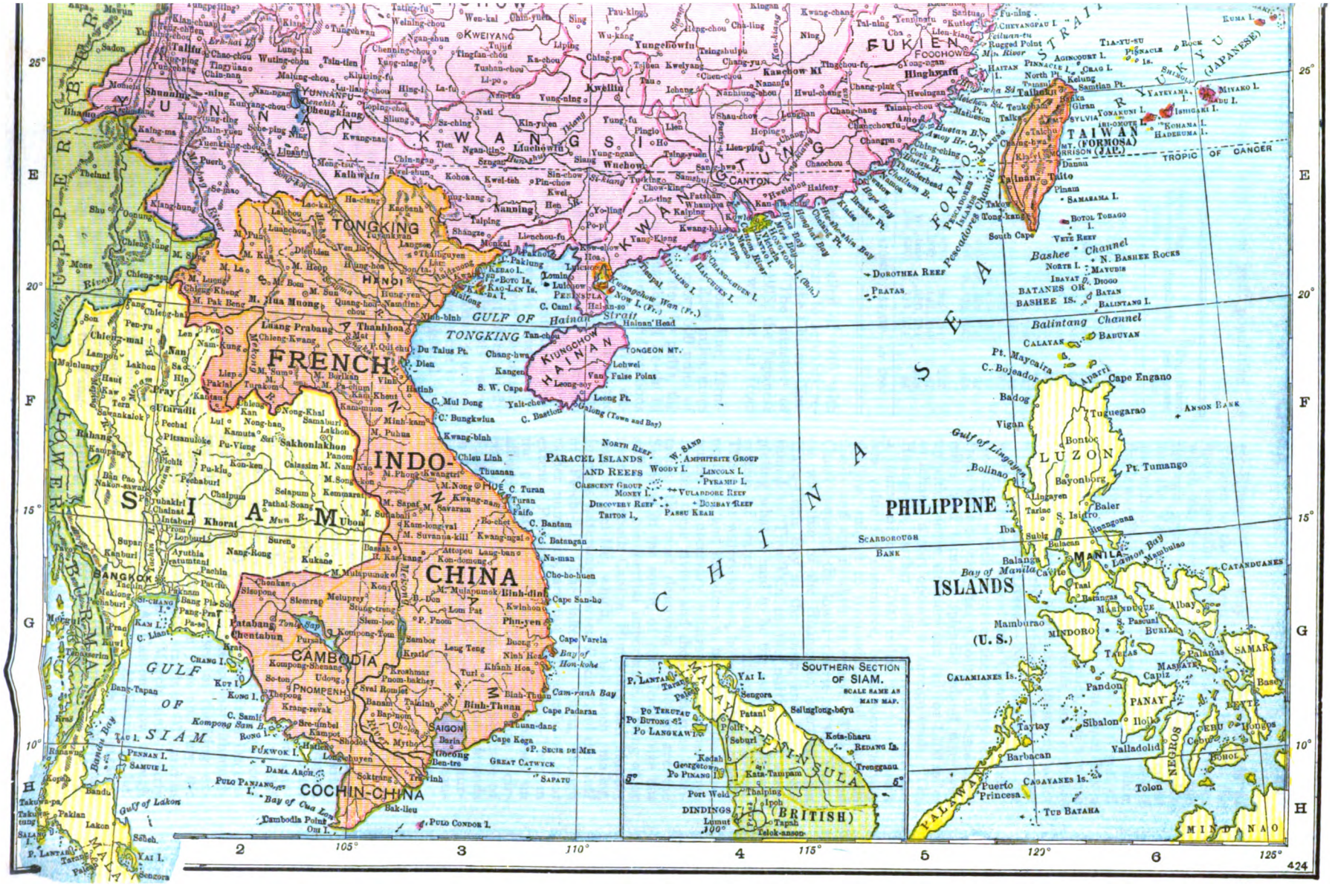

FRENCH INDO-CHINA
TONGKING
ANNAM
COCHIN-CHINA
CAMBODIA
SIAM
GULF OF SIAM
GULF OF TONGKING
CHINA SEA
PHILIPPINE ISLANDS
LUZON
MINDANAO
PALAWAN
TAIWAN (FORMOSA)
FUKIEN
KWANGTUNG
KWANGSI
YUNNAN
HAINAN
PARACEL ISLANDS AND REEFS
PRATAS
DOROTHEA REEF
SCARBOROUGH BANK
MACCLESFIELD BANK
Pescadores Channel
Bashee Channel
Balintang Channel
TROPIC OF CANCER
SOUTHERN SECTION OF SIAM.
SCALE SAME AS MAIN MAP.
BRITISH
MALAY PENINSULA
HANOI
SAIGON
BANGKOK
MANILA
CANTON
HONGKONG
KWEIYANG
YUNNANFU
PNOMPENH
Bay of Manila
Gulf of Lingayen
Gulf of Lakon
Bay of Cua Lon
Bay of Hon-kohe
Cam-ranh Bay
Binh-Thuan
Tonle Sap
Mun R.
Me Nam
Me Khong
Song Koi
Song Ma
Song Ca
Song Gianh
Song Giang
Song Thai Binh
Song Tra Khuc
Song Ba
Song Dinh
Song Dong Nai
Song Vam Co
Song Saigon
Song Vaico
Song Mekong
Song Bassac
Song Kompong Som
Song Kompong Cham
Song Kompong Thom
Song Kompong Chhnang
Song Pursat
Song Battambang
Song Kompong Luong
Song Kompong Tralach
Song Kompong Trabek
Song Kompong Prah
Song Kompong Thmar
Song Kompong Kdei
Song Kompong Kleang
Song Kompong Svay
Song Kompong Ro
Song Kompong Ta Meak
Song Kompong Ta Mau
Song Kompong Ta Nhim
Song Kompong Ta Nhan
Song Kompong Ta Nhi
Song Kompong Ta Nhut
Song Kompong Ta Nhung
Song Kompong Ta Nhuong

18 provinces with area and population as follows:

Provinces	Area; English square miles	Population	Population per square mile
Chi-Li (Pe-chi-Li)...	115,800	20,937,000	281
Shan-Tung.....	55,970	38,247,900	528
Shan-Si.....	81,830	12,200,456	149
Honan.....	67,940	35,316,800	376
Kiang-Su.....	38,600	13,980,235	448
Ngan-Hui.....	54,810	23,670,314	315
Kiang-Si.....	69,480	26,532,125	382
Che-Kiang.....	36,670	11,580,692	463
Fu-Kien (Fokien)...	46,320	22,876,540	282
Hupeh.....	71,410	35,280,685	348
Hunan.....	83,380	22,169,673	282
Shen-Si.....	75,270	8,450,182	111
Kan-Su.....	125,450	10,385,376	82
Sze-Chuen.....	218,480	68,724,890	314
Kwang-Tung with Hainan.....	99,970	31,865,251	277
Kwang-Si.....	77,200	5,142,330	67
Kwei-Chau.....	67,160	7,650,282	114
Yünnan.....	146,680	12,324,574	84
Total.....	1,532,420	407,253,029	av. 266

The official «census» so-called of 1910, with enumerations, only approximate to actuality reduces the number of souls in the Chinese Empire to about 325,000,000. The number of foreigners in the empire in 1915, the Japanese far outnumbering all others, was not far from 200,000.

Physical Features.— The coast-line, forming an irregular curve of about 2,500 miles, gives about one mile of coast for every 500 miles of area. It is not deeply penetrated by gulfs, the only one of great extent being that of Pe-chi-Li in the northeast, but numerous indentations form safe and capacious roadsteads. With exception of a bold and rocky peninsula in the province of Shan-Tung, the shore from the Gulf of Pe-chi-Li south to the island of Chusan is flat, and in many places so little raised above the sea-level as to be extensively inundated during a continuance of strong winds. From Chusan to the mouth of Canton River it is usually rocky; from this point southwest, flats chiefly prevail. A peninsula of some size juts out in the extreme south from Kwang-Tung province, separated from which by a narrow strait is the large island of Hainan. Chusan Island and archipelago are also of importance, but most of the innumerable islands dotted round the Chinese coast are very small. The large island of Formosa, off the east coast, now belongs to Japan. Many lighthouses have been planted along the coast. Owing to the exclusive policy of the Chinese and their dislike of foreigners, a great part of the interior of the country must be regarded as still almost a *terra incognita*. The surface is mostly mountainous. The general slope is from west to east, and the mountains are a continuation of those of Tibet and central Asia. Branches of the Kuenlun traverse almost the whole breadth of China. In western Sze-Chuen, there are peaks reaching the height of 25,000 feet. In the north the Nan-shan branch of the Kuenlun Range runs under various names along the northeast of China till it reaches the frontier of Manchuria, north of Peking. A third great mountainous region of China is in the southeast, where extensive chains stretch on the south of the Yang-tse-Kiang all the way from the highlands of Yünnan to the eastern seaboard. Between the main mountain system, and following courses which may be roughly described as parallel, run the two great rivers of China, the Hoang-Ho and the Yang-tse-Kiang. Here lie the central and richest Chinese provinces. On both sides of the lower Hoang-Ho is an immense delta plain, consisting generally of a deep alluvial soil of unparalleled fertility. This great plain has a length of not less than 700 miles, and a width varying from 150 to 500 miles, and probably maintains a denser population than any other portion of the earth's surface of similar extent.

Rivers and Lakes.— No country of the world is better watered than China. The Yang-tse-Kiang, which traverses the country centrally from west to east, has a course of some 3,000 miles, and forms a splendid inland waterway up which ocean steamers can sail for 1,100 miles to Ichang, a port opened to foreign trade. The Hoang-Ho, farther north, and next in size, has a course of over 2,600 miles, but is of much less value for commerce, being comparatively shallow, subject to tremendous and disastrous floods and apt to shift its course. The Grand Canal connects the lower course of the Yang-tse with that of the Hoang-Ho, starting from Hang-Chau Bay in the south, and being continued to Tien-Tsin in the north, thus completing what is said to be the most magnificent system of water communication in existence. This great waterway has, however, been greatly neglected, and threatens to become unnavigable, unless the necessary repairs are taken in hand. Besides these rivers and their numerous tributaries, the most deserving of notice are the Si-Kiang in the south, of considerable size but still more commercial importance, having at or near its mouth Canton, Hongkong and Macao; and the Pei-Ho, which, though much smaller, forms a waterway between Peking and the Gulf of Pe-chi-Li. The lakes of China, though rather numerous, are not individually of great extent. Perhaps the largest is Tung-Ting, in the province of Hunan, which furnishes an affluent to the Yang-tse-Kiang, and has a circuit of 270 miles. Po-yang, in the province of Kiang-Si, is 90 miles long by 20 broad, abounds in fish and is remarkable both for the picturesque scenery around it and the numerous beautiful and populous islands which it encloses.

Climate.— The greater part of China belongs to the temperate zone, only a small portion of the south lying within the tropics. It has what is called an excessive climate, and has a far greater range of temperature than is usual within the same parallels of latitude. Peking, the capital, is nearly a degree south of Naples, and yet while the mean temperature of the latter is 63°, that of the former is only 54°. In summer, however, the heat reaches from 90° to 100° in the shade, while the winter is so cold the rivers usually continue frozen from December to March. At Hongkong, notwithstanding the influence of the sea in checking extremes, the thermometer in June and July, the hottest months, frequently stands at 90°, and in winter, from December to March, sinks nearly to the freezing-point. At Canton, snow, though rarely, has sometimes fallen. At Shanghai, lat. 31° 20', the range of temperature is still greater, the maximum reaching 100°, and the minimum falling at least 20° below freezing, or 12° F.

In the south the climate is of tropical character, the summer heat rising to 120°. Here the southwest and northeast monsoons blow with great regularity, and nearly divide the year. In the north they are more variable. The violent hurricanes known as «typhoons» are not uncommon in the Chinese seas.

Geology.— The geology of China is very imperfectly known, but there is no doubt that all the leading geological formations are found in it. Primary formations are most largely developed in the mountainous regions of the west, where granite, gneiss and primitive schists prevail. The same formations exist to a more limited extent in the southeast, where bleak mountains of granite give that district a distinguishing feature. The secondary formation, including the carboniferous and cretaceous system, occupies a considerable area, and the coal fields of China are perhaps the most extensive in the world. The Tertiary formation has its largest development in the northeast, and probably underlies the greater part of the alluvium which covers the surface of the Great Plain. A surface feature of a great part of northern China is the earthy deposit known as «loess,» which covers an immense area both of mountain and valley, forming a yellowish-brown soil of the utmost fertility.

Mineralogy.— China is well supplied with useful minerals. Gold, though not thought to be very abundant, is obtained by washing the sand of several of the rivers, particularly those of the upper branch of the Yang-tse, and in the mountainous and almost inaccessible regions of Yünnan. Silver is also found in the same regions. The quantity suffices for a large annual export, chiefly in payment of various foreign goods. Copper, besides forming the ordinary currency in limited mercantile transactions, is worked to a great extent for economical purposes. Mercury or quicksilver, in the form of cinnabar, is of frequent occurrence, and is much used both for coloring and medicine. Its poisonous fumes are even said to be inhaled like opium or tobacco. There is no want of iron either in the form of rich hematite, or in that of the carbonate of the coal-measures, but smelting is not carried on to any considerable extent. Lead, tin and zinc exist, but owing either to a deficiency in quantity, or ignorance of the method of extracting them economically from the ores, the native products fall short of the consumption. Some authorities reckon the coal-fields of China as equal in value to all the other coal-fields of the world together, and some time they must certainly become of immense economic importance to the country. The area of the coal deposits in the southeastern part of the province of Hunan is about 21,700 square miles. The coal occurs as both bituminous and anthracite, but as most of it is raised without machinery, by the rudest forms of manual labor, the price is necessarily high, and the quantity mined is trifling. Defective means of communication partly account for the backward state of coal-mining. Coarse mixtures of culm and earth are used as fuel to some extent, while other still more inefficient and less attractive compounds are employed. Among other mineral substances may be mentioned nitre, alum, gypsum, and more important than all, inexhaustible beds of kaolin or porcelain earth, the early possession of which by the Chinese, and their great skill in working it, has given the name of China to the beautiful ware which so long monopolized the market of Europe. Jade appears to be found in China in its most perfect form, and is there held in the highest estimation, being wrought into trinkets and into ornamental articles of various kinds. Various precious stones also are found, and agates especially are admirably wrought.

Zoology.— China is said to possess about 200 indigenous mammals and over 760 birds, most of which are found in adjacent parts of Asia, and some are also European. Among the mammalia are several species of the monkey tribe, one of them being the so-called Cochin-China monkey, marked by a striking variety of stripes and colors. Another is the proboscis monkey. Tigers and leopards were at one time so numerous as to have been regularly hunted in state by the emperors, but these animals have been extirpated except in certain localities, especially in Yünnan and Manchuria. A small species of wild cat is sought for as game, and served at table as a delicacy. Bears are frequently mentioned, and their paws are said to be in high request among Chinese gourmands. Other carnivora include the lynx, badger, civet, marten and weasel. The elephant, rhinoceros and tapir occur in some localities of the southwest. Both camels and elephants are employed as domestic animals, the former only in the north. Bats are numerous, and one large species is extensively used as food. To the indigenous animals already mentioned may be added the wild hog, porcupine, raccoon-faced dog or Chinese fox, and several species of rats, more especially one of a yellow color, larger than those of Europe, and much prized for its skin. Several species of deer are met with, one being the musk deer. In birds, as above indicated, China is extremely rich. Pheasants in particular are famous, both for variety and for beauty. Among others are the well-known gold and silver pheasants, the former one of the most gorgeous of the feathered tribe. The peacock is also indigenous, and fowls akin to our common domestic variety. Birds of prey include eagles, falcons, owls, etc. Song birds, such as the nightingale and thrush, are well known and much appreciated. Water-birds of almost every kind abound, such as ducks, geese, swans, pelicans, etc. The mandarin-duck is a Chinese species famed for beauty of plumage. But perhaps the most remarkable water-bird is the fishing cormorant, the training of which forms an important employment, and is so complete, that when a bird has secured a fish which from its size he cannot manage singly, his neighbor darts down and assists him to complete the capture. The reptiles of China include several large serpents not regarded as dangerous, and one species at least which is very venomous. Tortoises are common and are often kept in gardens and pleasure-grounds. No country is said to possess a greater number and variety of indigenous fishes than China. All its waters — its rivers, lakes, pools, canals and even ditches — are full of fish. This is partly owing to the artificial means by which the natural supply is vastly increased. Boat-loads of water containing spawn are carried to distant parts and deposited in ponds, where the fry are fed with various species of lentils or with yolks of eggs.

Botany.— The flora is naturally extensive and varied. In the south it is tropical in character, farther north sub-tropical, and still farther there are many plants and trees identical or nearly so with those of middle Europe. Among trees commonly found in China the bamboo (if this gigantic grass should be called a tree), as in India, is perhaps the most valuable of all on account of the almost endless uses to which it is applied. Oaks of different species are common, and the economical uses of the various parts — the wood, bark and galls — are perfectly understood. Even the acorns of some kinds are ground into flour and converted into a farinaceous paste. Coniferous trees are represented by numerous forms of pine, yew and cypress, some of them of great economic importance. The tallow and camphor trees abound, as also the mulberry and paper-mulberry. Palms are not abundant, but the cocoanut flourishes in Hainan and on the adjacent coast. The Pandanus or screw-pine is abundant in the south, but the date-palm is not known. The chestnut, walnut, willow and hazel are all indigenous. The fruit-trees include the fig, mango, guava, lichi, loquat, orange, peach, pomegranate, quince, nectarine plum, apricot, etc. Plants producing lacquer or varnish and medicinal herbs of various kinds (including ginseng), are also well known. Among shrubby plants, the first place is unquestionably due to the tea-plant, of which further mention is made below. The next in importance is the mulberry, on the leaves of which the silk-worm is nourished. Among flowering shrubs or trees are the rose, with its numerous varieties, the hydrangea, the passion-flower, the lagerstroemia, Indian pride, the Chinese tamarisk, various species of cactus and the camellia. The Chinese flora is particularly rich in varieties of the azalea. Altogether the abundance of flowering-plants, shrubs and trees is a feature of the Chinese flora. Dwarfing is a favorite occupation and the Chinese horticulturists force plants to assume the most fantastic forms.

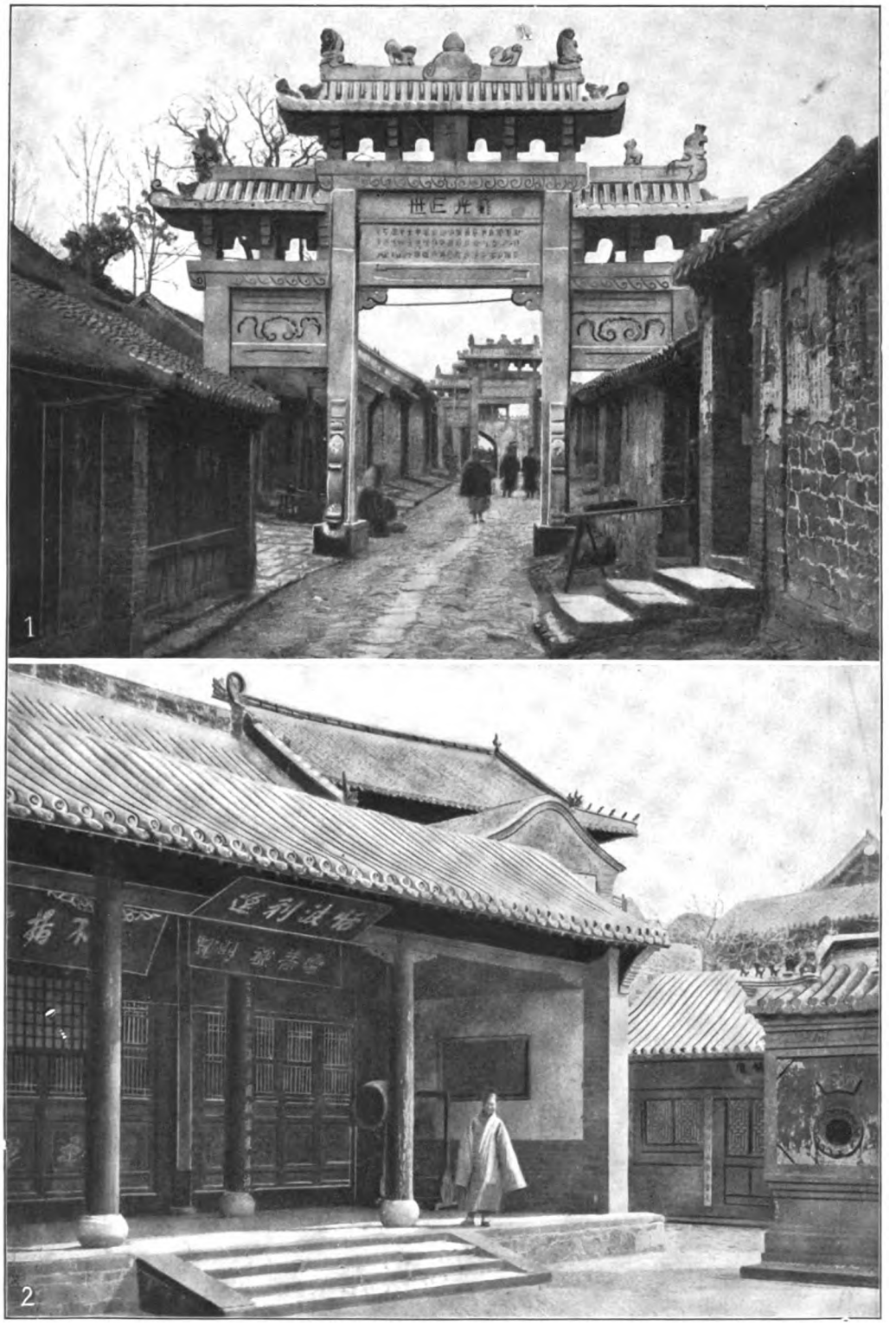
Agriculture.— This first of arts has always been held in the highest veneration in China. During the period of the Empire the emperor himself, to do it honor, repaired annually to an appointed spot with a large retinue, and, taking the plow in his hand, drew a furrow and sowed some seed. A similar festival is held in the capital of each province. The agriculture of the Chinese has been lauded in high terms by almost all who have had opportunities of witnessing it. In the important processes of stirring the soil, eradicating weeds, economizing manures, and applying them in the form best fitted to nourish the crop and bring it to maturity, they display unwearied industry and no small degree of skill. On account of the dense population, every square foot of land that can be made to raise food is kept in constant service and at the highest point of fertility. Even mountain slopes are terraced and tilled, sometimes to the height of 8,000 feet, wheat or other grains being the usual crop in these places. The farmers slavishly follow a routine which has been handed down without change from untold generations, and not only display no inventive powers themselves, but obstinately refuse to profit by the inventions of other countries. Their implements generally are of the rudest description and though improved European and American plows have been sent out and urged on their acceptance, they reject them with disdain, preferring a rude shapeless thing drawn by oxen or buffaloes. They appear to have no idea of raising improved breeds of horses and cattle by the arts so well known and practised in other countries. The only animal of which the Chinese can be said to have furnished us with an improved breed is the pig. Their asses and mules are also of good quality. Rice, as the principal food of the people, is the staple crop. The rich alluvial plains which cover a great part of the surface are admirably adapted for its culture, and, by careful management, yield amazing crops — not one merely, but in the south latitudes two crops of rice in the hot season, besides a winter green crop usually plowed in for manure. In the neighborhood of Ningpo, lat. 30°, where the summer is too short to mature two crops in succession, they are still obtained by an ingenious device. The rice is sown in seed-beds and afterward planted out in drills. A first planting is made about the middle of May, and in two or three weeks after, a second planting is made in the intervals between the previous drills. When the first crop is reaped in August the other is still green, but being stirred and manured, and having plenty of light and air, comes rapidly forward, and is reaped in November. All the steps of the process are conducted with the greatest care; and the water-wheel, worked by the hand, or by an ox or buffalo, is kept in daily operation from the first planting of the crop till it is nearly ripe. The reaping instrument is not unlike our sickle; and the crop, when not thrashed on the field, as is generally the case, is carried home and built up into stacks, resembling those of Europe. The rice is not always grown on alluvial flats, and there is a variety, known as dry-soil rice, that is cultivated like any ordinary cereal. The sides of the hills are often laid out in a succession of gently sloping terraces, and planted with rice in drills running across the declivity, thus admitting of being irrigated by streams which, retarded at every step, move slowly forward without acquiring any impetus. The same mode of culture is also practised with other crops. In the north the crops principally consist of our ordinary cereals and legumes — wheat, barley, pease and beans. Vegetables of various kinds are generally grown for household use. Varieties of the cabbage tribe are extensively cultivated for the sake of the oil extracted from the seeds. The raising of green crops to be plowed in as manure is generally common where rice is cultivated. Two kinds of plants are chiefly employed; one of them, a trefoil, grown on ridges similar to those which form the intervals in our celery beds. Among other crops regularly and extensively grown may be mentioned sugarcane, used chiefly in a green state; indigo; the castor-oil plant; and numerous plants grown for their roots. The opium poppy was once so extensively cultivated that the demand for the imported article fell off very greatly. Maize, buckwheat and tobacco may also be mentioned as cultivated crops. Three other plants of the greatest economical importance, and so extensively grown as to form important branches of Chinese agriculture, deserve a separate notice. The first is the mulberry. Judging from the

quantity of raw silk annually exported, and the general use of silk for dress, especially by the wealthier classes of the country, it is evident that a large area must be appropriated to the cultivation of this tree, and millions of persons employed in the different processes connected with it. The plants are not allowed to exceed from four to six feet high, and are planted in rows, often along the banks of canals. The mulberry farms are small, and are generally worked by the farmer and his family. The Chinese silk is much heavier than the Italian, and preferred in fabrics requiring lustre and firmness. Whether it owes its quality to a particular variety of mulberry, or to the climate or soil, has not yet been definitely ascertained. The second plant more particularly deserving of notice is the cotton-plant. That cultivated in China is of the same species as the ordinary American, namely, *Gossypium herbaceum*. The plant producing the yellow cotton used in the manufacture of nankeen appears to be of a more stunted habit than the ordinary cotton. It is chiefly cultivated in a level tract around Shanghai, forming part of the Great Plain, and is the staple summer crop. The culture differs little from that of other cotton countries, more especially the cotton districts of India. The third plant, the tea-plant, is cultivated in two varieties — *Thea bohea* and *Thea viridis*; and though it was long supposed that the former only yielded black and the latter green tea, it is now known that both kinds of tea are obtained from each. The great tea provinces are Kwang-Tung, Fu-Kien and Che-Kiang. In the first the *Thea bohea* is grown, and the tea is of inferior quality; in the other two the *Thea viridis*, which yields all the finer qualities and furnishes the greater part of all that is exported to Europe. In these two provinces, where the culture is most extensive and carried to its highest perfection, the tea plantations are usually formed in a deep rich loam, never on the low lands, but on the low hilly slopes. The tea farms, as common throughout China in all kinds of culture, are small, and their management, including not merely all the steps of the culture of the plant, but the preparation of the leaves for market, is almost invariably confined to the farmer and his family. The leaves are gathered thrice — about the middle of April, when the leaf-buds are beginning to unfold; about a fortnight after, in the beginning of May, when the leaves are fully grown; and when the leaves again are newly formed. The first gathering yields the finest and most delicate tea, but with considerable injury to the plants.

Manufactures.— In all the arts necessary to the comfort of life, and in not a few of those conducive to luxury, the Chinese have made considerable progress. One peculiar feature in their processes is the general absence of machinery. Except in a few industries the great moving power is manual labor. The silk stuffs of China have long borne a high name, and in several qualities are still unsurpassed. The loom in common use is worked by two persons, one of whom sits on the top of the frame, where he pulls the treadles and assists in making the various changes which must be made on the machine while in operation. By means of it the workman can imitate almost any pattern. The crapes and flowered satins, and damasks for official dresses, manufactured by the Chinese are particularly excellent. Everybody wears silks. It was formerly the prescribed attire of high officers, and soldiers were not considered in full uniform without it. The finer kinds form the ordinary dresses of the opulent, while the poorest manage to deck themselves in a coarser quality, at least on gala days. The embroidery of silk is carried on to an amazing extent, the perfection to which it has been brought creating an almost unlimited demand, both domestic and foreign, and employing myriads of the inhabitants. Steam-power has latterly been utilized in the reeling and spinning of silk. In cotton goods the Chinese make good and substantial fabrics, but the cheapness and good appearance of the foreign goods have given rise to a large importation. Nankeen, once so common in Europe, is still produced as before, and continues to form an important branch of domestic manufacture. Cotton mills and factories of the European type have recently been established. Linen seems not to be made in China. Flax is not grown, but a good substitute for it is found in the fibres of two or three plants, especially ramee, from which the beautiful grass-cloth, similar in appearance to linen, is extensively woven. Woolen fabrics are made only to a very limited extent. The consumption of leather in China is not great, and the manufacture of it is very imperfect. The porcelain of China has been famous from the earliest periods. The manufacture of the finest forms of it being long known to the Chinese alone, gave them the monopoly of the world, and though in elegance of shape and design they must now yield the palm to Europe, for quality of material and rich gorgeous coloring they still hold perhaps the foremost place. Paper is an article that has been made in China from an early period and with great success. The manufacture of glass is not carried on to a great extent, and this is one of the few arts which, at least in regard to its finer processes, the Chinese have condescended to learn from Europeans. In beautiful lacquered ware the Chinese continue unsurpassed. Much of its excellence appears to be owing to the fine varnishes which they have learned to extract from native plants. Except in some few articles the Chinese are backward in the manufacture of metal goods; but recently, and under European leading, machinery, small arms and ordnance, warships, etc., are being produced in the country, as well as soap, matches and other articles. Many small articles made by hand display much finish and delicacy of workmanship. See CHINESE ARCHITECTURE AND ART.

Trade and Commerce.— The inland trade of China, aided by the unusual facilities which it derives from a system of water communication, ramifying like net-work over all its provinces, is of incalculable magnitude. Its rivers and canals are so covered with junks and barges and swarms of smaller boats that there does not seem much exaggeration in the estimate which makes the tonnage belonging to the Chinese little short of the combined tonnage of all other nations. The inland commerce, however, is much hampered by the rarity of good roads.

By the opening of the principal ports the foreign commerce has been immensely increased. Till 1842 the trade with foreigners, exclusive of that carried on by the mainland



1 A Street in Tungchow

2 Reception Hall of Temple

1 The Custom House, Shanghai

2 Hu-Sing Ting — Chinese Tea-House, Shanghai

through the town of Kiachta, with the Russians, was jealously restricted to the mouth of Canton River. By the Treaty of Nankin, in the above year, Hongkong was ceded to Great Britain, and Canton and four other ports were thrown open, namely, Amoy, Fu-Chau, Ningpo and Shanghai. At subsequent dates other ports have been added to the list of treaty-ports for foreign commerce, and about 30 ports are now open, the most northern being Niu-Chwang, in Manchuria, and the farthest inland being Chung-King, on the upper Yang-tse, some 1,500 miles from the river's mouth. Steamers do not go higher at present than Ichang (1,100 miles), the trade above this being carried on by junks or other craft. Several other of the ports are on the Yang-tse. Of all the Chinese ports, Shanghai, at the mouth of the estuary of the Yang-tse, carries on much the largest trade. Regardless of the war, the trade here in 1916 was greater than ever before. The direct foreign commerce exceeded the returns in the year 1913 by $50,000,000; and the increase over 1915 was $100,000,000. Forty-two per cent of the total foreign trade of China was transacted here. In 1902 China agreed to open five new treaty ports, Chang-Sha, Ngan-King, Wan-Hsien, Wai-Chau and Kong-Mun.

Among the countries which maintain commercial relations with the Chinese the principal are Great Britain and her dependencies, Hongkong and India, Japan, the United States and Russia. The latest trustworthy statistics relating to the foreign commerce of China are set forth in 'The Americas' (New York, July 1916, Vol II, No. 10), from which we quote as follows: "Official returns of the trade of China in 1915 have reached this country from Shanghai. The net commerce, not including the trade of Hongkong, and exclusive of a considerable total of goods carried by Chinese vessels not within control of the Maritime customs and plying between coast towns and treaty ports, has been (stated in Haikwan taels, equaling 62 cents, U. S.): 1915, imports 454,475,719; exports 418,861,164; as compared with 1914, imports 569,241,382, and exports 356,226,629," etc. It is shown by the complete statistics for the decade 1906–15 that 1915 was "China's record year for exports, in spite of interference with shipping. Demand for silk, tea, natural dyes, antimony and other Chinese products, also higher prices, raised the total of exports. A drop in imports was accounted for by a boycott of Japanese goods and by the fact that, owing to shortage of dyestuffs, colored cottons were not obtainable in usual quantities and at reasonable prices, and as white is the mourning color in China, the undyed materials could not be marketed." The total trade of China through the *entrepôt* of Hongkong was 252,606,127 Haikwan taels. Excluding the trade of Hongkong, China's total trade with the United States in 1915 amounted to 97,622,706 Haikwan taels; with Great Britain 103,493,356; and with Japan 197,926,331 Haikwan taels (1 Haikwan tael = 62 cents currency of the United States).

The Chinese, in carrying on their extensive dealings, domestic and foreign, have in all 24 weights and measures, but of these only 6 are in common use, namely, the liang or tael = 1⅓ ounces avoirdupois; kin or catty = 1⅓ pounds avoirdupois; and picul = 133⅓ pounds used in weighing bulky articles; and decimals of a tael, called mace or tsien, candareen or fan, and cash or le, used in reckoning bullion, gems, drugs, etc., 19 cash making 1 candareen, 10 candareens 1 mace. The only native coin now current is the cash, a small piece of thin circular copper about three-quarters of an inch diameter, with a square hole in the middle for convenience of stringing. Native silver bullion, called *sycee*, and gold bullion of similar shape, and usually stamped with the names of the banker and workmen, and the year and district in which it is cast, are used in larger transactions. All taxes are paid in *sycee* of 98 per cent fineness. Private bankers are found in all large towns, and some of them pay interest on deposits. They issue paper money, which passes current in the particular districts where they are known. The Mexican dollar has been made a current coin all over the empire. In Shanghai, Tien-Tsin, Han-Kow and the northern ports, the tael is commonly used.

Railroads.— Railway history began in 1876 when the Wu-Sung line was built. The lines in working order are as follows: Shanghai to Wu-Sung (opened 1898); Kai-Ping to Pe-Tang; from Tien-Tsin to within a short distance of the Great Wall, by way of Chan-Hai-Ouan, and with connection to Peking (built by Li Hung-Chang's advice; length 298 miles). Of lines conceded and projected in 1897, the list is as follows: (*a*) The Russian line through Manchuria, with branch to Port Arthur and Niu-Chwang (began in 1897, and completed in 1904; length of main line 1,200 miles, branch line 600 miles). (*b*) The German Kiao-Chau line (total length, 621 miles). (*c*) The Franco-Belgian line from Peking to Han-Kow (the first line to be constructed by Imperial decree). The line will connect with Tai-Yuan-Fu and Singan-Fu. (*d*) The Anglo-German line from Tien-Tsin to Chin-Kiang with connections to Tsi-Nan; total is about 620 miles. (*e*) The English line from Tai-Yuan to Fu-Chau (298 miles); and two lines from Shanghai, one in the direction of Su-Chau, Chin-Kiang and Nankin, the other to Hang-Chau and Ningpo. (*f*) The Belgian line from Canton to Han-Kow, with a junction at Hongkong. (*g*) The French lines from Lavi-Kai to Yünnan-Fu from Lang-Son to Long-Chau and from Nan-ning-Fu to Peking. An edict in 1911 commanded that all railway trunk lines should revert to government and that provincial control should cease. The concessions granted for railroads in 1913 include one to a British firm, from the city of Sha-Shi in Hupeh through Honan and Kweichan, a distance with branches of 800 miles, the contract being signed 18 October. On 23 October two railways in Shantung were contracted for by German parties, one to join the Hankow main line. On 24 June 1914 an agreement was made extending the German line to Su-Chau, one of the richest cities in China, and through populous regions especially rich in canals. Another line westward was provided for, both to form ultimately a part of the state system, after repayment of the loan. To French parties was granted through the Banque Industrielle de Chine, a concession to build a railroad through the southern provinces, 1,000 miles long from Yam-Chau near Pakhoi on the Gulf of Ton-Kin, through Nan-Kin, to Yünnan-Fu and to Chung-Kin in Szechuen. The same bank secured in March

an agreement to loan $30,000,000 for harbor improvements at Pu-Hau and trolley lines and public conveniences in Peking. On 31 March 1914 the British and Chinese Corporation agreed to a loan of $40,000,000, at 5 per cent for 45 years, for further extensions of the Shang-Hai-Nan-Kin line. Active work in all these enterprises, however, has been for the most part suspended because of the European situation. Inclusive of 1,800 miles in Manchuria, the total mileage of Chinese railways in operation in 1915 was 5,960, with 2,273 miles under construction. Railway receipts in 1915 amounted to 50,933,059 taels (approximately $33,106,488); expenditures, 36,566,916 taels ($23,768,495).

People.— The Chinese belong to that variety of the human race which has been called Mongolian, but in them its harsher features, as represented in the genuine Tartars, are considerably softened. The southerners are of low stature, have small hands and feet (the last often artificially made so small in the females as to become a deformity), an olive or yellowish complexion, much modified by the degree of its exposure to the open air, prominent cheekbones, depressed nose, eyes obliquely turned upward at the outer extremities, black hair, scanty beard. In bodily strength they are far inferior to Europeans, but superior to most Asiatics, their great assiduity and patient endurance of fatigue making them highly prized as laborers throughout the Indian Archipelago. Some of the finest physical specimens of the race are to be seen among the coolies or porters of Canton. The Chinese are deficient in courage, yet often display great contempt for death. In their moral qualities there is much that is amiable. They are strongly attached to their homes, hold age in respect, toil hard for the support of their families, and in the interior, where the worst kind of foreign intercourse has not debased them, exhibit an unsophisticated and pleasing simplicity of manners. In the great mass these qualities are counterbalanced, or rather supplanted, by numerous vices — treachery, lying, gambling, opium-smoking, etc.

Population.— The Imperial treasury department of China in 1910 published an official census of China in connection with a readjustment of the imposts that are destined to pay its war indemnities. It appears from this census that the empire contains 426,000,000 inhabitants, and that China Proper — with its 18 provinces — contains 407,000,000. In the provinces, the number of inhabitants per square mile is greatest in Ho-Nan and least in Kan-Su. In the dependencies the density of population is far less than in China Proper, especially in Mongolia and Turkestan, which are very sparsely populated. The density is 22 times greater in Ho-Nan than in Manchuria. The population of the United States as a whole is about 20 persons per square mile. The population of China Proper is about 300 per square mile. If the whole population of the United States and 40,000,000 more were crowded into the State of Texas the density of population would be about equal to that of the Yangtse Valley and of the plain extending north and south between the lower courses of the Yangtse and the Hoang rivers. Ngan-Hui but a little larger than New York State has more than three times the population. Che-Kiang province, slightly less in area than Kentucky, has more than 10 times the number of inhabitants, and between Kwan-Tung and Kansas the ratio is 21 to 1.

No census figures based upon official returns are obtainable for the dependencies, and the nature of the population in these regions makes even a close estimate difficult. The data for 1910 may be given approximately as follows:

China	407,330,000
Manchuria	8,500,000
Mongolia	2,580,000
Tibet	6,430,000
Sungaria	600,000
East Turkestan	600,000
	426,040,000

Religion.— Judging by the multitude of temples and joss-houses seen in every quarter, and the endless number of ritual acts performed on high festivals and in the ordinary intercourse of life, the Chinese are a most religious people. The religion of the state was for ages Confucianism, founded by Kung-Fu-Tse or Confucius, about 550 B.C. Another religion is Taoism, introduced about the same time by Laotsze, and numbering a good many adherents. (See CONFUCIUS; LAO-TSZE). Among the great mass of the people a form of Buddhism prevails, or a curious mixture of religious ideas and forms. In the conduct of daily life they are under the dominion of innumerable superstitions, living in dread of demons whom they constantly endeavor to ward off or appease. Their belief in feng-shui, or the influence of "aspects," works against the introduction of railroads and other modern improvements. Attempts to introduce Christianity were made by the Nestorians as early as the 6th century, but the celebrity of the Jesuit missions has thrown all others into shade. The Roman Catholics now claim to have about 1,000,000 adherents among the Chinese. Various Protestant bodies carry on missionary operations in China. There are now probably over 50,000 native Protestants. During the Boxer massacres many native Christians were martyred.

Education and Philosophy.— The immediate object of Chinese education has been twofold: (1) To prepare students for the conduct of life; and (2) to fit them for office under the government. Both in the elementary schools and in those of the highest grade the purpose was ever kept in view of giving the scholar a command of those branches of knowledge which formed the old Chinese curriculum of studies. These were almost wholly literary — the classics, some knowledge of history and poetry and skill in working the abacus. On this numeral frame, employed in a much simpler form in Europe long ago, but of greater scope and with a more elaborate system, still in use from Petrograd to Tokio, the skilled accountant can add, subtract, multiply, divide, extract the square and cube roots, work decimals and fractions. The expert can usually complete the calculation more rapidly than by our mental or mechanical methods. Iu the higher grades, the schools, private instructors and writing masters prepared lads and young men for the civil service examinations which, for over 1,000 years, have been one of the institutions of China. These teachers, usually men who had been unsuccessful applicants at the civil service examinations, were to be found in most villages, as well as in large towns and cities. In old China

this official system, of purely literary competition for appointment to office, had become in effect little more than a method of training the memory and for producing experts in penmanship, while educating the literary tastes. Such a discipline, however, bore slight relation to the exercising of the judgment, to the provocation of original thought, or to informing the student concerning the world outside of China, while but slightly fitting him for the practical duties of statesmanship or administration. The reason assigned for this official system of education was that all the people, individually and in mass, were presumed to be so well versed in the maxims of Confucius and so thoroughly indoctrinated in ancestral ethics, that both private and public virtue was supposed to be automatic. The clash with Occidental civilization exposed the weakness of this antiquated system, and it came to an end during the revolution, out of which arose the Chinese Republic. For some years previous to this the schedule of examinations had greatly changed, the reformed curriculum including such subjects as the history of Western nations, political economy, civic administration, finance, taxation and the physical sciences. The ancient brick examination halls, with their hundreds and thousands of stalls, in which students spent days, and in which some might be found dead or exhausted, are now no more, for schools and colleges on Western models have taken their places. Though in one sense the Chinese, who almost worship letters, are the most literary of peoples, probably not 10 per cent can read books; though a much larger percentage of the males know the characters needful in their crafts or trades. Until very recently, female education, so far as it existed, was mainly a private or a family affair. Of late years, largely through missionary influence and example, the education of women has made surprising progress and the tendency is now strongly toward more equality in intellectual training without regard to sex. The second great purpose of education was personal culture, looking to the right conduct of life. China, like all old nations with unique or advanced civilization, has a long and interesting literary history. After the dateless evolution of writing, Confucius — the Ezra of China — in the 6th century B.C. collected the literary inheritances of the past and reduced the ancient traditions to systematic and easily communicated form. The literary bequests of the sage, preserved by his pupils, became the textbook, of the nation, the basis of family and school training and the social bond of a then comparatively small community. Nevertheless the people thus equipped with a weapon of culture more potent than the sword, even a deathless literature, was to enter upon a career of expansion and to erect a political structure that should ultimately as an empire include not only China proper but also most of eastern Asia within China's own boundaries. In time this culture influenced also many distant, neighbor, vassal or pupil nations, to whom Great China was suzerain, teacher or model. Mencius (B.C. 372–289) made popular the ethics of the sage, applying them especially as practical principles of government. He gave his work so democratic a tone and flavor that when, 2,000 years later, Chinese and especially Japanese scholars perused the American Declaration of Independence and the Constitution of the United States, they thought that surely "the barbarians must have studied Mencius"! It is no wonder, therefore, that the first universal Emperor, Shi Wang Ti (209 B.C.), who abolished feudalism, built the Great Wall and unified China in imperialism, and in what he perhaps meant to be benevolent despotism, ordered, as tradition loves to state, the destruction of literature and the decapitation or exile of hundreds of the literati. Students of scientific mind remembering that Shi Wang Ti was a centralizer and unionist of strenuous proclivities, use freely the salt of critical opinion here. The reputed tyrant acted less from hatred of literature as such than fear of the democratic sentiments of Mencius and of the ultra-conservatives, who, though men of letters, were rather too bigoted adherents of feudalism and their feudal patrons and hopelessly wedded to old-time notions. Under another dynasty, early in the Christian era, the ancient texts were recovered, ink and paper replaced the iron stylus and the bamboo slats and civil service examinations were established. Then in succession followed Buddhism, the study of Sanskrit and the train of ideas from India — to issue later in the blending of Mongol and Hindoo ideals — the foundation of the Han Lin or Imperial Academy (Forest of Pencils), printing by means of cut blocks and later by "living" or movable types (made not indeed of zinc and antimony but of various materials) the compilation of dictionaries and cyclopedias and the creation of the drama and the novel. The era of the Sung dynasty (960–1126) was the Augustan or Golden Age of literary splendor. Whole libraries of books, on a multifarious variety of subjects, attest the mental fertility of the age. To a large degree, this epoch has been prolonged to our day. It was not, however, until the 11th century that the various systems of Confucianism, Taoism, Buddhism clashed in a contest that for a generation threatened anarchy to the whole empire. During a time of apparently boundless national prosperity a school of politicians arose (A.D. 1021–1086) with socialistic or populistic notions which they first sought to found on the classic literature and then proceeded to put into practice. Their theories and methods show a startling resemblance to modern discussions and experiments. At their acme of temporary success they demanded the overthrow of existing institutions. Against these innovators, a school of writers and party agitators arose (1009–1086) in opposition, who contended for the ancient principles of the sages. At first the radicals won, but after some years the people demanded the return of the old order and the conservatives gained power. This bloodless struggle compelled deep thinking on vital themes.

After a generation of thought, a re-statement of the old faith, or neo-Confucianism, issued (1130–1200) in which it seemed as though all systems had entered and passed through the crucible and taken the form of a creed. No longer a mere ritual, or phase of philosophy, the new system of belief, which has since influenced half of Asia, showed itself to be a fusion of Taoist and Buddhist elements with Confucianism, or Universism, as the chief element; for in this neo-Confucianism, the ethics of the sage are paramount. Yet this

«medley of pantheism» is a true creed, which, in both China and neighboring nations, has been often enforced with a cruelty quite equaling that of the southern European. To-day, against this creed Mohammedanism and Christianity concentrate their forces. The compromise made by the State through Yuan Shi Kai and his supporters, seems to be much like that of those persons in the State churches of Europe and among ourselves, who, while subordinating dogma and the peculiarities of sects, conform politely to mild ritual and the forms supposed to be needed for upholding society and keeping control of the masses. Modern science, while seriously disturbing some of the elements in the «pantheistic medley» of the modern Chinese gentleman's creed, seems on the whole to harmonize finely with the ancient ethics, which seem also to the average Chinese man to be so pleasantly modern, while capable of being merged into the rising tide of Christianity.

Customs, Manners, Dress, etc.— Among the Chinese, politeness is carried to an extreme. They scrupulously avoid all contradiction in conversation, and are careful not to use any offensive or irritating expressions. From the same source arises the tedious, frivolous and often absurd etiquette and extravagant compliment for which they are remarkable. But even here a wish to please and gratify is sufficiently evident. An invitation to dinner is written on a slip of red paper, and is sent some days before; it is usually in this style: «On the ——— day a trifling entertainment will await the light of your countenance; Tsau Sanwei's compliments.» This is followed by another card naming the hour. The dinner itself is sumptuous, wine and spirits are drunk freely, and the whole affair goes off with a great deal of boisterous merriment. Fresh pork, fish and fowl form the staple articles of food, with vegetables of various kinds. Beef and mutton are rare. Opium and tobacco are in common use. The usual beverage among all classes is tea, of which the Chinese consume enormous quantities.

In ordinary cases, strict separation prevails between the male and female branches of a household. Betrothment is entirely in the hands of the parents, and is conducted through the medium of a class of persons called *mei-jin*, or go-betweens, whose office of matchmaking is considered honorable. The marriage itself is conducted with much ceremony, gay processions and other convivialities. Besides one wife, strictly so-called, a man who can afford it may have several subordinate wives. A wife may be divorced on several grounds that we should deem frivolous. Infanticide is common among the very poor, the female children being almost the only victims.

The return of the new year is an occasion of unbounded festivity and hilarity in China, and New Year's Day is a universal holiday for rich and poor. At this season all accounts are expected to be adjusted, and if this is delayed or neglected the creditor has sometimes recourse to the expedient of carrying off his debtor's door. On New Year's morning all shops are shut, and this usually continues for several days. There are also various festivals throughout the year, but no weekly day of rest. Gambling is universal in China. Porters play by the wayside while waiting for employment; and hardly has the retinue of a great official seen the latter enter the house when they pull out their cards or dice and squat down to a game. Dress, like other things, undergoes its changes in China, and fashions alter there as well as elsewhere; but they are not as rapid or as striking as among European nations. Regarding dress, there are certain restrictive laws in operation. The mandarins or officials have some special peculiarities of dress, and their respective ranks are indicated by the nature of the knob or button they have on the top of their hats. The wearing of the queue or pig-tail, perhaps the most noticeable external peculiarity of the Chinese as regards costume, was a sign of loyalty to the Manchu dynasty, but with their deposition and proclamation of the republic, is now a thing of the past. The headdress of married females is becoming, and even elegant. The copious black hair is bound upon the head in an oval-formed knot. No caps, bonnets, hoods, or veils are worn abroad; a light bamboo hat, or an umbrella, protects from the sun. The extraordinary practice, peculiar to China, of compressing the feet of females (especially those of the better class) into unnatural form and dimensions is now rapidly passing away under the new order of things, since the republic was ushered in.

Dwelling-houses are generally of one story. The common building materials are bricks, sifted earth, matting or thatch for the walls, stone for the foundation, brick tiling for the roof and wood for the inner work. The fronts present no opening but the door. The walls are often stuccoed, but not painted, and the bricks are occasionally rubbed smooth with stones and the interstices pointed with fine cement. The general internal arrangement of a Chinese dwelling of the better sort is that of a series of rooms of different dimensions, separated and lighted by intervening courts, and accessible along a covered corridor, communicating with each, or by side passages leading through the courts. Streets are generally so narrow as to be mere lanes. The most characteristic Chinese structures are the pagodas, built generally with a number of stories, each marked off from the rest by a peculiar projecting portion.

Government, Laws, Army and Navy, etc. — In our supplementary remarks we have glanced at the abolition of the Manchu system of government, which was a modification of the older Chinese system and at the reforms made under the republic, but it is more than probable that much of the old routine in administration will remain. The provinces, either singly or by twos, are under a governor and subgovernor, and each province has also a chief criminal judge and a treasurer. Particular magistrates preside over particular districts and cities, and instead of being permanent are changed about once in three years. The great object aimed at is to maintain a strict surveillance and mutual responsibility among all classes; in other words, to imbue them with fear of the government and infuse a universal distrust. The chief protection of the people is in a body of laws, called Ta-Tsing-Liuh-Li, that is, «statutes and rescripts of the great pure dynasty» which are held in high regard, and agreeably to which, with occasional violations, all public functions are discharged. The new

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code of laws that is being drawn up for the Chinese republic is to be the work of a Japanese professor of law. The old distinctions of Manchu and Chinese have, however, been abolished and the reorganized national army, equipped with modern weapons and appliances, has shown its effectiveness in recent years quite satisfactorily. Numbers of Krupp guns are mounted on the fortifications; and there are arsenals superintended by Europeans. The navy contains several cruisers and other war vessels of the modern type, but the Chinese lost their most powerful ships in the war with the Japanese, and their navy is now of comparatively little strength. Three protected cruisers were built in 1897 in Germany for the Chinese fleet, and several sea-going torpedo boats, ordered before the war, have been also added. The revenue of the republic is derived from customs, excise and the land and salt taxes. Calculating on the basis of statistics for 1901, if the customs duties, including the sum payable in lieu of the *likin* or in land-transit dues, be computed at about 10 per cent, the revenue, if payable in gold, would be about $20,000,000.

China had a national debt before the war of 1894–95, and at the close of that contest she assumed a new indebtedness of $187,500,000. The aggregate amount which the foreign powers were to receive by way of indemnity for the Boxer outrages in 1900 was $337,500,000, payable in 39 annual instalments. The whole of the Chinese customs revenue, if payable in gold, would be equivalent to about 6 per cent of the indemnity.

History.—The early history of the Chinese is shrouded in fable, but it is certain that civilization had advanced much among them when it was only beginning to dawn on the nations of Europe. The names of numerous dynasties belonging to a period two or three thousand years before Christ are still preserved, but how much, if any, of their early history is authentic, cannot be determined. The Chow dynasty, which was founded by Wu Wang, and lasted from about 1100 B.C. to 255 B.C., is perhaps the earliest that can be regarded as historic, and even of it not much more is historic than the name. Wu Wang is said to have divided the kingdom into 22 feudal states, and the continual internal rivalries which resulted from this policy encouraged Tartar raids and invasions. Under Ling-Wang, one of the sovereigns of this dynasty, Confucius is said to have been born in 551 B.C. During the latter half of the period in which this line of sovereigns held control there appear to have been a number of rival kings in China, who lived in strife with one another. Chow-siang-Wang, who was the founder of the Tsin dynasty, attempted to bring all China under his rule, but he was unsuccessful. His great-grandson, however, a national hero of the Chinese, who was the first to assume the title of "Whang" (emperor), and henceforth called himself Tsin-Shi Whang Ti, succeeded in accomplishing this. He ascended the throne at the age of 13 and fixed his capital at what is now Segan-Fu. Besides building a great palace there, he constructed numerous roads, canals and buildings throughout the country. He completely defeated several Tartar and other neighboring tribes and suppressed a revolt in his own country. The Great Wall of China was begun by his command, and it was he who ordered all books treating of the past history of China to be destroyed. The present name of China is derived from the name of this dynasty. The Tsin dynasty ended with Whang-Ti's grandson, who gave way in 206 B.C. to Lew Pang or Kaou-Te, the founder of the Han dynasty. Toward the end of the 2d century, or soon after the beginning of the 3d century, of the Christian era, the empire was divided into three states, which were again united under one ruler before the end of the 3d century. During the 10th century the right to the throne was disputed, and civil war raged till an adjustment took place by the establishment of the Tsung dynasty under Tae-Tsu 960 A.D. Under this dynasty great progress was made in literature and art. Inroads of Tartar hordes now pressed the Chinese so hard that they called in the aid of the Mongols or western Tartars, who freed them from their oppressors, but gave them a new master in the celebrated Kublai Khan who founded the Mongol dynasty, and removed the capital from Nankin to Peking. His ninth descendant was driven from the throne and a native dynasty called Ming again succeeded in 1368 in the person of Hungwu. A long period of peace ensued, but was broken about 1618, when the Manchus gained the ascendancy, and after a war of 27 years established the Tartar dynasty in the person of Tung-Tchi, which came to an end in 1911. According to the Chinese, their dynasties, 26 in number, embrace a period of about 5,000 years, during which between 200 and 300 sovereigns have held the throne. The earliest authentic accounts of China published in Europe are those of Marco Polo, who visited the country in the 13th century. The first British intercourse was attempted under Queen Elizabeth in 1596, but the vessel sent did not reach its destination. A trade was subsequently established at Canton by the East India Company, but no direct intercourse between the governments took place till the embassy of Lord Macartney in 1793, which was well received by the Emperor Keen Lung. A second embassy in 1816 of Lord Amherst was treated with insolence, and returned with a letter from the emperor to the prince regent, bearing among other things, "I have sent thine ambassadors back to their own country without punishing them for the high crime they have committed." The arrogance thus manifested could not fail, sooner or later, to bring on a collision; and accordingly, in 1841, the British, on being refused redress for injuries, partly real and partly alleged, proceeded to hostilities, and after scattering almost without a struggle every force which was opposed to them, were preparing to lay siege to Nankin, when the Chinese found it necessary to sue for peace. A treaty was then concluded, by which the five ports of Canton, Amoy, Fu-Chau, Ningpo and Shanghai were opened to British merchants, the island of Hongkong ceded to the British in perpetuity and the payment of $21,000,000 agreed to be made by the Chinese. In 1850 an insurrection headed by Hung-seu-Tseuan or Tien-Te, who gave himself out as a descendant of the Ming dynasty, broke out in the provinces adjoining Canton, with the object of expelling the Chinese Tartar dynasty from the throne, as well as of restoring the ancient national religion of Shan-Ti, and of making Tien-Te the founder of a

new dynasty, which he called that of Tae-Ping, or Universal Peace. After the capture and execution of Tien-Te his place was taken by Hong-Sin, who identified Shan-Ti with the God of Christianity, and regarded himself as called of God to make the old true religion of China again predominant. For a long period the insurgents succeeded in maintaining their ground against the imperial forces, and it was not till after the lapse of several years that the latter were enabled in some degree to quell the rebellion. Notwithstanding the cruel retaliation by the victorious party, and the wholesale massacres perpetrated on the insurgents, they were unable to stifle the spirit of revolt. In October 1856 the crew of a vessel belonging to Hongkong were seized by the Chinese on the allegation that they had been concerned in a piratical attack on a Chinese vessel. The men, on the remonstrance of the British authorities, were afterward brought back, but all reparation or apology was refused. The attitude taken by the Chinese in this matter led to a declaration of war, and in 1857 the Chinese fleet was almost totally destroyed, and Canton was taken by the French and English troops. A treaty was at length concluded with Lord Elgin on behalf of the British, by which important privileges were secured; but an attack on the French and English ambassadors who were on their way to Peking to have the treaty ratified by the Emperor led to the renewal of the war. The allied forces marched toward Peking, and after twice defeating the Chinese troops entered the city. This brought the Chinese to their senses, and the treaty was ratified. Meantime the Tai-Ping rebellion had been gaining strength, and the trade of Shanghai and Canton was materially interfered with. The British thereupon decided to assist the Chinese in quelling the insurrection, and the services of a young engineer officer, Capt. Charles Gordon ("Chinese Gordon," afterward so well known in connection with the Sudan), were lent to the government for that purpose. The rebels were gradually driven from their posts and in July 1864 Nanking, their last stronghold, was taken. But the empire was still disturbed by rebellion in other parts. The Mohammedans in Chinese Turkestan, wishing to take advantage of the weakness to which the Chinese government had been reduced by the Tai-Ping rebellion, revolted almost simultaneously, but apparently independently, with those in the province of Yünnan in the southwest. In both cases the rebellion resulted in the temporary separation of the provinces from the empire. In 1883 hostilities broke out between China and France in consequence of the warlike operations of the latter in Tonkin and her claim to the protectorate of the country; but the matter was arranged early in 1885. In 1894 war broke out with Japan in connection with Chinese misgovernment in Korea, and in this struggle Japan had almost an uninterrupted success both by land and sea, driving the Chinese out of Korea and invading China at several points. Peace was concluded in 1895, China agreeing to give up Formosa and pay a large indemnity to Japan, to open additional ports to foreign commerce and to recognize the independence of Korea. In the autumn of 1897 two German missionaries were murdered in the province of Shan-Tung, and the admiral commanding the German squadron on the China station immediately effected a landing in the bay of Kiao-Chau, which, after much discussion, was finally leased to Germany early in January 1898. This acquisition of Chinese territory by Germany attracted much attention among other powers whose interests were likely to be affected, and was followed at brief intervals by the leasing of the town and harbor of Port Arthur in the Liao-Tung Peninsula to Russia, and the leasing of the bay of Wei-hai-Wei to Great Britain. On 22 September a *coup d'état* was effected by the dowager-empress of China, who had acted as guardian to the Emperor Kwang-Su during his minority, by which the emperor was again placed under her dominion. The prompt remonstrances of the representatives of the powers at Peking served to prevent any extreme procedure on the part of the Empress and her advisers, and the Emperor afterward nominally regained power, but early in 1900 was reported to have abdicated.

In September 1899 Secretary Hay instructed the United States representatives in England, France, Germany, Russia, Italy and Japan to invite from those governments a presentment of their intentions in regard to the treatment of the commerce of foreign powers in the newly acquired spheres of influence, with special reference to the treaties existing between China and the United States, advising that China be regarded as heretofore as an open market for the world's commerce, and that all possible steps be taken to establish much-needed administrative reforms and to preserve and strengthen the imperial government in its integrity. On 20 March 1900 Secretary Hay announced that all the powers concerned had accepted the proposals of the United States, and that he would consider their consent final and irrevocable. In May 1900 a secret society, colloquially known as the "Boxers," rose in the provinces of Shan-Tung and Pe-chi-Li and massacred native Christians and European missionaries. The Boxers were encouraged by the empress-dowager and the palace-party at Peking, who placed themselves at the head of a movement directed against foreigners. The ministers at the European legations in Peking — Sir Claude Macdonald being at the head of the British legation — determined to requisition guards for their protection, and these arrived on 31 May. On 4 June the Boxers destroyed the Peking-Tien-Tsin Railway, and by cutting communications isolated the Europeans in Peking. Soon after the chancellor of the Japanese legation and Baron von Ketteler, the German Minister, were murdered in the streets. In hope of relieving the legations, Admiral Seymour put himself at the head of 2,000 European troops and bluejackets and set out from Tien-Tsin for Peking, but had to retire. Meanwhile the Chinese had been manning the Taku forts at the mouth of the Pei-Ho, and making preparations for closing the entrance to the river. The commanders of the allied fleets — British, French, Russian and German — in the Gulf of Pe-chi-Li summoned the Chinese commander to surrender. He refusing, they opened fire on the 17 June, bombarded and destroyed the forts. The allied forces entered the foreign city of Tien-Tsin on 23 June, and the native portion of the city was taken on 14 July. All this time the legations at Peking were closely besieged and con-

stantly bombarded. The smaller legations having been destroyed or rendered untenable, their occupants, together with a number of native Christians, took refuge in the British legation, which, from its extent and strength, offered a better prospect of protection. The legation was ill supplied with provisions, and the defenders were reduced to extremities, when the relief force of 12,000 men, comprising British, American, French, German, Russian and Japanese troops, captured Peking on 15 August. Before the arrival of this force the empress-dowager and her court, with the Emperor Kwang-Su, had fled from the capital, and it was impossible, with the troops and transport available, to overtake them.

Troops of various nationalities had been dispatched from Europe to North China with all possible haste, and Count von Waldersee, the German commander, had been accepted by all the allies as commander-in-chief, but international jealousies soon made themselves apparent, and complications seemed likely to ensue. In October 1900 it was announced that Lord Salisbury had concluded an agreement with Germany by which the two powers bound themselves to the principle of the "open door" in China, to abstain from seeking to obtain for themselves any territorial advantage, and to take such steps as might be agreed on for the protection of their interests, as against any other power seeking territorial aggrandizement. Subsequent military operations consisted chiefly of punitive expeditions to the south and west. Negotiations for peace were at once entered upon. On 4 December the powers sent a joint note to the Chinese peace commissioners, demanding among other acts, the execution of the leaders in the massacre of foreigners and the payment of an indemnity, which in October 1901 was fixed at $735,000,000. On the ratification of the indemnity agreement, the foreign troops were withdrawn from Peking. Later, through the good offices of the United States, the indemnity was reduced, being fixed at $337,500,000.

After the Boxer episode the Imperial Court returned to Peking and again assumed governmental powers. Yet, while the dynasty was showing a disposition to reform abuses and conform to the world's general customs and laws, two currents of influence were flowing away from the Manchus. The idea among diplomatists and writers from 1902 to 1908 seemed to be that of the imminent "break-up of China," while the determined purpose of the newer generation of enlightened natives was to have a new China with a new form of government. Meanwhile Russia and Japan were moving to their clash in Korea and Manchuria. The vital question to the Chinese millions, however, was this — dismemberment by foreigners, or "the five countries" maintained in unity — whether under empire, constitutional monarchy or republic. Which?

All question of the "break-up of China," its dismemberment and division as spoil among aliens, passed out of sight when the government of the United States of America, through the logic of events, entered the field of Far Eastern politics as a power to be henceforward reckoned with. This was especially manifest in the negotiations resulting from the Boxer riots. The action of Admiral Lewis Kempff, U. S. N., following the precedents set by President Washington, in his refusal to join with the allies in making war on China, by bombarding the Taku forts, when as yet no hostile shot from a soldier or sailor employed by the Chinese government had been fired, gave the Americans the "inside track," making China ready and glad to listen first and accede to whatever the United States proposed, in diplomacy or finance. The Americans set the precedent to all the powers, of prompt evacuation and retirement of their military forces, thus teaching that China must work out her own salvation. The old policy of European predatory aggression was further disapproved and the unbroken precedent settled since the foundation of the American government, of considering the Asiatic nations, not as material for conquest and spoil, but for humane treatment and fair dealing, was followed. Not only was the outrageously heavy indemnity demanded by the Powers reduced one-half, but, after satisfying all possible demands for loss by the Boxer rioters — the missionary societies for the most part waiving or declining to make any claim — the sum of $13,000,000 was set aside, to be paid back to China. Under this arrangement, at the suggestion of the Washington government, nearly a thousand young men and women, appointed after competitive examinations, have been sent to the United States to be educated. Distributed in our schools, colleges and universities, these young people have cut off their queues and adopted the coiffure and clothes which are now becoming uniform throughout the world. Through the Cosmopolitan Clubs now so numerous and other means of culture they have gained knowledge of the world at large.

Greater in influence on China, even than the United States, has been Japan, especially since that military clash, in 1904–05, between organized intelligence and the ignorance of despotism, manifest in the Russo-Japanese War. In the one case, an army and navy, in which practically every man could read and write, made proof, in the field and at sea, under scientific leaders, of what Japanese soldiers and sailors are capable. The struggle was not one of religions, or races, or civilizations, but of equally brave men under varying capacity of leadership, and was virtually the victory of education over illiteracy, of public schools over repression and ignorance. While the battle of Mukden was pending, the writer made prediction that if the Japanese, victorious as they were sure to be, guarded from loot or dishonor the tombs of the Manchu dynasty at Mukden — in Chinese ideas, blessing or cursing of ancestry or spirits, whether of Mikado, Son of Heaven, or common folks being vastly more significant than in the case of contemporaries — "they would have the heart of China in their hands"; in a word, that the Chinese would look at once to the Japanese as their models and teachers. As matter of fact, before they had fully attended to their own wounded, the Japanese set a guard around the Manchu tombs, which were kept inviolate. Thereupon, victory being assured and known throughout China, not only did the Peking government assent cordially to the provisions of the Portsmouth treaty (q.v.) in which it had no part, promising Count Komura faithful co-operation, but from all over China students at once crossed the sea to Japan, until

the schools in Tokio were embarrassed by the largeness of the invasion. No fewer than 20,000 Chinese young men and hundreds of girls, from 1904 to 1910, studied in Japan from a few months to six years. The overwhelming majority of them were found to be, in the eyes of the Peking government, seditious, and many were openly plotting to destroy the Manchu dynasty. Returning home, they began direct agitation for a change of government, this time in co-operation, financially and morally, with their countrymen in America, Hawaii and in other lands. From the first the note of their public harangues and secret meetings was this—"Let us gain the world's sympathy. Refrain from injury to the life and property of the foreigners. If we do not, our cause is lost. Let us strike at the Manchus for a new China and make clear our object to the world, acceptance of modern conditions; friendship, not isolation." The last of the 35 or more (general or local) dynasties that ruled China was the Great Bright (Ta Tsing) or Manchu, whose Tartar chieftains began to be powerful about A.D. 1500. Summoned early in the 17th century by a faction of the Ming emperors, to help in a civil struggle, these men of the horse and tent rode into China like a whirlwind. Once in and securing victory for their patrons, and seeing at once the wealth and weakness of the land, they refused to return. In 1644 the Ming dynasty ended. Beginning the conquest of the empire, the Manchus compelled all subjects to shave the fore-skull and adopt the queue, as the symbol of loyalty. The Manchus camped in China as the Turk in Europe, virtually monopolizing the military and most of the civil offices and revenues, keeping apart from the Chinese, but in time yielding to luxury, weakening in their primitive race-fibre, losing their language and customs, and virtually being conquered by the superior brain and ability of the people they ruled. At first the Manchus seemed to be "the most improvable race in Asia," but in the end, while the Chinese yielded notably to the spirit of the age, the Manchus appeared for the most part incapable of responding to the necessities of the modern world. Reformers and thinking men saw that their continuance in office boded disaster and meant the ultimate partition of China by foreigners. Young men educated abroad, on coming home, found the situation intolerable. Already two generations of reading people (probably 8 or 10 per cent of the whole population of the empire) had been enlightened; first, by the teachings of Christian missionaries; second, by the floods of printed matter, in Chinese, sent out by the Society for the Diffusion of General and Christian Knowledge, in which books on science, true history and biography of famous men and women of the West were numerous; and third by those tens of thousands of Chinese who had lived abroad. The death of the Emperor and Empress Dowager, in November 1908, and the appointment of Prince Chun as regent of the infant named to fill the throne hastened the inevitable. The Peking government, compelled to read the signs of the times and yielding to pressure, promised a modern constitution and a national legislature, sent commissions abroad to study systems of government, but postponed the date of that assembling of the Diet, which would mean in effect the transfer of power from the Manchus to the people. This postponement, with the dismissal of Yuan Shi Kai from all his offices, as the result of a Manchu reaction, served only to irritate the revolutionists and to precipitate their action. Now appeared a leader, a Christian and a man of science, the physician, Dr. Sun Yat Sen, converted in an American Congregational church in Hawaii and long a resident in America and in London, in which city he had been kidnapped by minions of the legation, but released on the instant demand of the British government. With extraordinary powers of reticence, organization and influence, he spoke and acted at the right moment. In the main he represented southern China. Probably seven-tenths of the new men, working for the reform of China, were educated in the United States. In the north, the man of destiny was Yun Shi Kai, a worthy pupil and successor to Li Hung Chang. Meanwhile the elections to and formation of provincial assemblies proceeded, following the Japanese precedent for the development of constitutional government. After riots at Chang-sha, in 1910, and troubles in various places, the revolutionary movement became general and Wuchang was captured by the insurgents. So serious was the situation that Yuan Shi Kai was recalled to power, but the Imperial troops made little way and many of them as well as the Imperial navy went over to the other side, the educated classes sympathizing with the reformers and the men of the new army being well armed and skilfully led. The ability of the Chinese to fight under competent leaders had been first demonstrated by an American adventurer, Frederick G. Ward, of Salem, Mass., who drilled, organized and led to battle the force which, after Ward's death in 1862, under "Chinese Gordon" became the Ever Victorious Army and nucleus of China's modern military power. In late days, the grateful Peking government erected a memorial temple in his honor. There were some battles, in 1911, and much destruction of property, but on the whole the revolution in China was comparatively bloodless. One notable innovation was the presence on the field of battle of doctors and trained nurses. Strenuous efforts were made to remove foreigners to places of safety and even during battles the rival forces ceased firing to allow missionaries to cross the lines. By edict of 30 Oct. 1910 the Manchus, in the name of the child-emperor, granted a constitution, with a cabinet from which nobles (the only permanent nobility in China, in addition to the honorary, non-political one of the descendants of Confucius, being Manchus) were to be excluded, with pardon to all rebels and political offenders. Even this was not satisfactory and the result was the proclamation of the Chinese Republic, with a flag of five colors, the bands or stripes representing China, Manchuria, Mongolia, Tibet and Turkestan. In February 1911 the Ta Tsing dynasty came to an end, the republic and the dynasty, through Yuan, making terms of amicable agreement. Dr. Sun abdicated his leadership in favor of Yuan, who became first President of the Chinese Republic, the presidential seal being ceremoniously delivered to the Premier 29 March. Millions of Chinese have cut off their queues and have adopted, in whole or part, the common dress of the world, but probably seven-tenths of the people of the

empire are conservative and opposed to innovations. The first troubles of the new state came from mutiny, riots and looting by the unpaid troops. At least $300,000,000 are needed to support the government, pay the soldiers and begin public works and national development on a large scale. Months of trouble and anxiety followed, because the six powers, Great Britain, France, Germany, the United States, Italy and Japan, though wishing to loan the necessary money to China, imposed hateful conditions — viz., the right and power to dictate how the money should be spent and to have foreigners on the board of audit. This, to the Chinese mind, means not only loss of national sovereignty, but, sooner or later, foreign intervention. Stiffened by the precedent of Japan in 1865 and 1868, when money was borrowed in London by free men, at 10 per cent, rather than at 4 or 6 per cent, with political dictation, in order to maintain her sovereignty inviolate, China waits before accepting "the gifts of the Greeks." Sun handed over the seal of the Republic to Yuan Shi Kai, who had been elected President of the Chinese Republic.

The history of China after 1 April 1911 largely centred in the personality of Yuan Shi Kai. The man of power and poise was a thoroughly typical Chinese, having never been outside of China except in Korea in 1882–85, where, beginning at the age of 23, he showed exceptional ability and vigor, especially in asserting Chinese claims and in resisting the Japanese, both in reforms and in aggressions. Born in Hunan province, in 1859, he became the pupil and favorite of Li Hung Chang, learning the methods of his master to perfection, especially in those arts of statecraft which balance one set of forces alien to China against another, thus dividing the counsels of the foreign ministers. He made the undertow of reaction break the force of opposing waves and often neutralized the schemes of aliens, whether these were planned from purely sordid motives or in the name of humane civilization. The idealist Sun Yat Sen resigned and transferred office and power to Yuan, the newly chosen provisional President of the United Republic, which, in theory at least, under the reorganization of the government in transition from a monarchy to a republic "retained the territorial heritage of the Chinese empire intact." The provisional president, once in office, was confronted with the inherent difficulties arising from a vast complexity of problems in a hastily created republic, which had behind it in either the people or their leaders little or none of the experience necessary for stable federal government. The fundamental fact underlying all Chinese history is the radical difference in influences of climate, temperament and training between the Northern and Southern man. The differences racially, historically and psychologically, between these types are much greater than between the ante-bellum Americans above and below Mason and Dixon's line, but less eradicable than those drawn by surveyors are the lines that divide the men of China in inheritances, feelings and aims. The alien thinks rather of Russians and Italians, or more analogically, of the Germanic and the Latin races in Europe, where in the south are the peoples older in history, differing in stature, complexion and mental traits together with the unsocial attitudes, to other neighbors or aliens, which self-conceit, race pride and mutual jealousies naturally breed. The southern Chinese, shorter in stature and swarthier in complexion, older in history and more subtle in mental processes, look upon the Northerners much as in every land the cultured look upon the crude. Contrasting the men in the Nanking and Canton regions, the Northerners, more mixed in ancestry, taller and more robust in body and lighter in complexion, are much younger in historic development, while simpler and more direct in mental action. Race pride is common to all Chinese, as the inheritors of the primitive culture, ancient ideals and ethics and philosophy of Confucius, but patriotism, in our sense of the word, has been nearly unknown in China except among a comparatively few.

Yuan Shi Kai and the Northerners had from the very first believed in and stood for a constitutional monarchy, while the men of the south, led by Sun Yat Sen, were for a republic.

On this rock of sectionalism the Chinese ship of state was almost sure to suffer wreck. On accepting office Yuan Shi Kai agreed to the provisions of the Southern or Nankin constitution, under which a national council was to be called and a permanent president chosen by a two-thirds majority in a session at which three-fourths of the members were present. The term of the provisional government was fixed at six months, at the end of which time Yuan Shi Kai, as he declared in beginning his administration, would either retire or seek re-election. The names of the chief departments were changed and great reforms were proclaimed. These to some extent were put in force. The new premier and cabinet officers were chosen on the theory of a coalition of sections, parties and interests. Until the new Parliament should be elected, the functions of such a body were performed by a National Council, composed of five members from each province chosen by the provincial assemblies. This Parliament was to consist of a House of Representatives of 596 members, chosen by those male citizens over 21 years of age who were eligible to vote at the polls; a Senate, which was to have 274 members, elected by the provincial assemblies or electoral bodies in Tibet, Mongolia and Turkestan. The army, navy and departments of justice and education were to be reorganized.

The Nanking Constitution, accepted by Yuan Shi Kai, while it defined the provisional president's powers, did not fix his term of office or settle the method of the election of future presidents. On 10 March Yuan formally took the oath of office and the seat of government was transferred from the Southern capital to the Northern capital, that is frrom Nanking to Peking. On 29 April the new Parliament, or National Assembly, of the Chinese Republic was formally opened; 177 senators and 500 representatives being present. Most of the delegates from the provinces of China proper were dressed in black coats of the European style. The other divisions, Mongolia and Tibet, were well represented. Dissensions in the Cabinet soon developed, rising to a crisis in June, in which the President and the Southerners, or Cantonese, were in opposition to each other on the question of Cabinet formation. The Southrons insisted that there should be government

by party, the Cabinet to be either wholly neutral or formed from one of the three parties then existing, and that the ministers of one of them, the Tungmenhui, should resign their portfolios. To this Yuan Shi Kai was opposed and he gained the victory. The retiring ministers then allied themselves to another party in opposition to the government. During the ensuing summer numerous local outbreaks occurred in southern China. In August, when a plot against the Republic was unearthed, two of the leaders in Peking were arrested and summarily shot. The Parliament made severe criticism of this act of the chief executive, but when Yuan made public the full facts, a majority of the members justified him, and on 6 October Yuan Shi Kai was elected by the National Assembly permanent President of the Republic, no limit being set to his term of office. On this same day, Russia and Japan formally acknowledged the Chinese republic, the United States and some other countries making no move in this direction.

It was hoped at home and abroad that by the co-ordination in harmony of the legislative and executive branches, a true republican government in China would be the result. Yet here China's initial experiences tallied with those of Japan's, showing how much alike are human experiences in the application of political science. In Kioto in 1868, in the rebound from despotic one-man power of the Shogun and in compliance with the oath of the Mikado, put into his mouth by liberal revolutionists, a deliberative assembly was called and twice, in 1869 and in 1870, met in Tokio. Its members being utterly without experience and ignorant of the problems pressing upon the nation for quick solution, the gathering became first a mere debating society and then an obstructive force, hindering good government. It was dissolved and no national assembly was called again, until after violent agitation, in 1889, or 21 years later. Moreover, many of the men who led in the revolution of 1868, which placed the Mikado in supreme power, had hoped for a limited monarchy after the English fashion, with the sovereign responsible to the Parliament. Instead of this, arbitrary government by a bureaucracy, or committee of a few ministers held its own and ruled the empire until 1889. Even when the constitution was proclaimed, the Liberals, after a generation of agitation, felt themselves betrayed by the men who had so long and exclusively held the power, in that the Prussian instead of the English model had been followed and that all the legislative powers of the Imperial Diet comprised a mere fraction of what had been hoped for. China, in 1912, not only lacked the experience of the other nations, in which a republican form of government has been successful, but even that preliminary intellectual preparation, through philosophy and the critical study of history, that had lent such power and so admirably fitted the Japanese leaders to change the system in vogue for over 600 years. From the start, without attending to the pressing and intricate problems facing the nation, the one purpose of the Chinese Parliament of 1914, especially among the Southern members, seemed to be to hamper the President in every possible way, preventing his obtaining the necessary money for national reconstruction, to reduce him to a mere figurehead and to place all power in the hands of the Cabinet. The action of the President in signing the Five Power Loan contract on 26 April, without consent of the National Assembly, was repudiated by a large majority in the votes taken 29 April and 5 May. The truce between the two parties now ended and threats were made of a second revolution in the South. Yuan answered by announcing coercion as the policy forced upon him to preserve the republic. A deadlock lasting two months followed. In July, a cashiered officer started a rebellion which soon spread through the Yang-tse provinces and the Nanking army joined the insurgents. By prompt action and good finance, backed by the loyalty of the well-paid navy and the provinces north, east and west, after some fighting near Shanghai, the revolt was suppressed and the leaders, with Sun Yat Sen, fled to Japan. In a word, before even the foundations had been laid for a parliament, here were men utterly inexperienced, trying to found a republic. After eight months of unproductive wrangling, the Cromwellian single precedent of England in 1653, and the double one of the Mikado of Japan in 1869 and in 1870, were followed. Yuan expelled from the Parliament the Kuo Ming Tang, or body of obstructives, by mandate of 4 Nov. 1913, on the plea of their complicity in the southern revolt.

No quorum being left for business, Yuan nominated 71 members of the Assembly to form an Administrative Council. This body, legislative and advisory, was to take the place of or represent the Premier, the Cabinet, the nine ministers and the provinces. With this body Yuan exercised full government powers and, with the approval of its members, issued on 11 Jan. 1914 a proclamation dissolving the National Assembly and, later, the district councils in the provinces, as being seditious in character and as hindrances to national administration. In a new draft of the constitution, amended by a convention of his own nominees and published 1 May 1914, the power of the President is increased by his virtual domination of the single-chambered legislature, which has no more control over the "fixed expenditures" prepared by the government, than has the Imperial Diet of Japan. An advisory council assists the President but there is no Cabinet and all authority over the provinces and the army and navy is centralized in the executive. It was this concentration of power that enabled the government to suppress with comparative ease the uprising in the south, organized and led by Sun Yat Sen.

In the industrial and financial spheres, matters improved through the more efficient system of taxation in the provinces, returns from the salt tax, the extinguishment of loans. Concessions for further railway building were granted to foreigners, French and British, and the British and Chinese corporation and for the exploitation of the oil wells in Chi-li and Shen-si by a Chino-American company. The sufferers by the floods in Kiang-su and Anhui were provided for in arrangement with the American Red Cross organization, the idea being prevention as well as cure. During May and June 1915 a commercial delegation of 18 honorary commissioners from the Chinese cities visited the United States and was well

received, while preparations on a large scale were made for the development, especially of the soil and agricultural resources of Manchuria with American capital.

China has always been a church nation and religion an affair of state, duly graded, provided for and safeguarded, the Emperor in the great temple of Heaven in Peking, worshipping with imposing sacrifices the supreme impersonal principle, heaven; while the provincial governors paid homage to the spirits of Heaven and Earth; and the common people rendered honor to their ancestors. Apart from ritual and social ethics, Chinese religion may be defined as Universism, through which man is expected to be in obedience to and in harmony with the universe and the laws which govern it, to make recognition of its order, to observe the seasons and in all human relations to be in mutual obligation and dependence upon each other. In a word — the word which Confucius consecrated — reciprocity is the keynote of the harmony of China's social system, which means each individual consecration to human brotherhood. The sudden change from monarchy to a republic dislocated this social system and loosened the ethical bonds holding the nation together.

In accordance with Chinese habits of thought the necessity of official sanction and encouragement to law and order was quickly and keenly felt, though nothing had been said about religion in the provisional constitution. Yielding to this demand, President Yuan proposed in 1913 the establishment of the ancient Confucian system, but this was stoutly opposed by the men of other religions, Buddhist, Mohammedan and Christian. A certain amount of compromise seems to have been made by Yuan as representing the nation, when, solemnly entering the great temple in Peking, he paid homage and offered sacrifice to Heaven, and proclaimed anew the old system, in so far at least as duties to the State are concerned. At present among leaders of thought, Chinese ideas as to religion are in solution or process of transition. In judging of this, as of all measures affecting the mass of Chinese, the alien must remember that the overwhelming majority of people are governed by the force of tradition and habit, only a small fraction being interested in any reform or radical change that disturbs the daily routine of life, which for them finds its best comfort in Universism.

The outbreak of the World War in 1914 made Chinese territory again the scene of conflict. Under pressure from her ally, Great Britain, Japan sprang joyfully to the double task of settling several old scores with Germany and of eliminating German occupation and influence not only from China but from the eastern hemisphere. In short, Japan proved herself an apt pupil in all the European methods so long employed in the Far East. She was quite ready to enforce, at a sacrifice of blood and treasure, her new version of the Monroe Doctrine; withal, more than willing to practise on the Chinese those arts of diplomacy backed by armed force, which European nations for over a century made use of on China and old Japan.

With her fleet and army equipped with the latest modern resources of offense in the high air and the deep sea and on land and water, the plan was to capture Tsingtau, on which the Germans had expended $60,000,000 and to control the lines of traffic in Shantung which radiate from this seaport. Against the protest of China, the Japanese troops under General Kamio were landed and marched inland 150 miles north of the professed objective, thus violating the neutrality of China. The activities of blockade, march and siege, lasted from 11 September until 11 November, when the army under the sun banner marched into Tsingtau. The Japanese victors found a model city, with fine architecture, hospitals, pavements, sewers, perfect sanitation, which in 1913 had a population of 60,484 souls, 55,672 being Chinese. From 1903 to the outbreak of hostilities commerce had increased tenfold. It was now to be seen what disposition would be made of the prize of war, which, as the Japanese government had acknowledged before the world, belonged to China. Against the spirit, method and details revealed in the unfolding of the policy of the new trespassers on her soil, China made protest, declaring that her sovereign rights had been ruthlessly violated. In practising political morality these fresh aggressors, despite professions loudly made from Tokio, showed no more conscience or mercy in diplomacy or actions than European powers during the previous century, or in any of China's numerous humiliations. Being virtually without a navy or army — all the available Chinese troops having been utilized to prevent threatened revolutionary uprisings in the southern provinces — China had to submit to the violations of her sovereignty as ordered from Tokio. The custom houses and conquered area were put under the control of Japanese officers. These aggressions were followed on 18 Jan. 1915 by the presentation of 21 peremptory demands from Tokio, the Japanese Minister, Mr. Hioki, presenting them personally at night and directly to the President of the Chinese Republic. Under the plea of "maintaining the peace of Eastern Asia and of further strengthening the friendly relations existing between the two neighboring nations," it was demanded that China should agree to what Japan might arrange with Germany, to cede no land in Shantung to any foreign power, to open new ports, to extend the leases of Port Arthur, Dalny, and of the railroads to a period of 99 years, to allow an equal voice to Japan in all matters relating to South Manchuria and Inner Mongolia and her people equal privilege with the natives, to employ Japanese instructors and advisers, to buy 50 per cent of war munitions in Japan, to have arsenals and technical schools worked jointly by the two governments, to allow Japanese to build railways and work mines in specified places and have full freedom for the Japanese to propagate religious doctrines. In explaining to foreign governments, at their request, the meaning of her negotiations with China, Japan replied that of the 21 articles under negotiation, 10 were demands and 11 were requests. After 25 meetings between the plenipotentiaries of China and Japan, the matter was not yet settled in April. Meanwhile the British and Russian ambassadors in Tokio had made protests and the representatives of the two billions of dollars of British money invested in China, especially in the Yang-tse region, sent complaints to London, warning of the impending danger not only to China but

to Europe. After much had been conceded by the Chinese commissioners, negotiations were at deadlock, while every day the real nature and true details of Japan's "requests" were becoming public. One of the points of struggle related to the mines of the Han Yeh Ping region, where are coal, iron and limestone in close proximity. Japan, poor in metals, having sunk millions in establishing steel foundries and compelled to import 75 per cent of her iron and steel, wished control of these mines in China for her military equipment. Moreover the Japanese, having seen in China and in other lands the potent results secured by the employment of foreign experts and advisers, and having herself, in a generation or two, been raised to the position of a world power, largely through the aid of the peaceful army of 5,000 *yatoi*, or salaried foreigners in her employ and in every line of human achievement, from 1870 to 1900, may be said, in this special measure to have introduced into diplomacy the principle we may designate as *yatoism*. In a word, she would imitate her European teachers, the trading nations, who have always had "a solid substratum of force" in dealing with the Orientals and forcing their goods and employees upon them. Finding the Chinese resistant to her demands and warned by her ally, Great Britain, the government in Tokio modified its demands both in tone and amount, and on 26 April made presentation of these, but this time requiring immediate compliance. In answer, given 1 May, China granted the rights of residence, lease and business to the Japanese, refused the long leases, demanded that the Japanese, like other aliens, submit to the laws of China, that Kiaochau be unconditionally retroceded, and the right of participation in negotiations with Germany after the war be given her, intimating also that this was the final word. In answer, Japan withdrew the most objectionable group of demands, but left open for "future discussion" the negotiations begun but not yet settled. adding, on 6 May, that an answer was desired at once, and the Tokio Government mobilized its military forces for the invasion and coercion of China.

Apart from any question of political ethics, or any attempt at condemnation or justification of Japan, let it not be forgotten that her actions toward China, in 1915, are no more severe than those against herself, or rather against the insurgents, either of 1868-69, or in the years from 1870, or in the great southwestern rebellion of 1877. Then and now, her fierce, unwavering determination to modernize herself and to compel China to be modern also, has been shown, as well as her equal zeal in humane efforts after victory. In this, also, she has equaled Great Britain after the Boer War; in a word, Japan imitates the Anglo-Saxon nations.

In China the opinion of the executive council was still divided when, on Friday, 7 May, the ultimatum was received from Tokio, giving 48 hours for decision. Having no military to withstand the aggressor, the Chinese government on Sunday, 9 May, at 1:30 A. M., yielded and signed away her sovereign rights. In return for Japan's sacrifice of life and treasure, Kiao-chau, which had been under German control since 1907, was to be handed over to China on conditions that virtually ignored China's sovereignty in the matter. The new peace arrangement gives Japan control of a railway of great strategic importance, with valuable rights and privileges for the Japanese, but probably no greater than for other foreigners. New treaty ports are to be opened, the leases of Port Arthur and Dalny are extended to 1997, that of the South Manchurian Railway to 2002 and that of the Antung-Mukden Railway to 2007. What may be the full meaning of the other concessions made to Japan, only time will show.

But this time Japan, while probably succeeding in her supreme and underlying purpose of forcing China to change from mediæval to modern conditions and thus furnish, for Japan's advantage, in a better and more speedy way than any other, a market and field of enterprise for her people, also preserved the unity of China and thus forestalled her "breakup" and division by European powers.

A boycott of Japanese goods began which ruined thousands of traders from Nippon, involving a loss of millions, while from 7 May began a new spirit of resistance in the Chinese people making for national unification and increase of power to withstand all foreign aggression. All these events weakened in China the prestige of the republican government and the personal influence of Yuan Shi Kai. An agitation in favor of the restoration of the monarchy began and soon assumed dangerous proportions. After consultation with natives and foreigners, Yuan Shi Kai decided that the best form of government for China would be found in a return to monarchy. Expert legal advisers, one of them an eminent American, gave the same opinion — that a republic for China was premature and that a monarchy was best suited to her conditions. Advice was received from Japan on 28 October to Yuan Shi Kai to arrest this movement, the gist of the words from Tokio being that in the present uncertainty of the status of the Powers, owing to the war, any change of government was inadvisable. After officially and with promptness recognizing the Chinese Republic, Japan felt that she was trifled with when a monarchy was proposed. So insistent was this "advice" that, when a Complimentary Mission to Tokio from Peking, designed to arrange for recognition of the monarchy, arrived in Tokio, 16 Jan. 1916, it was virtually refused an official interview. Nevertheless, an "election was ordered by Peking and carried out, the apparent results being overwhelmingly in favor of Yuan Shi Kai becoming emperor. Preparations were made for induction into office on New Year's Day, but this date found the strong man of the empire still engaged in a diplomatic duel with Japan and at the same time confronted by a possible rebellion which promised to involve all southern China, and the formal ceremonies of induction into office were postponed. The opening of the spring of 1916 found the opposition of Japan so strong and the indication of widespread revolt so menacing that Yuan, on 24 March, issued a mandate renouncing his title of Emperor of China and proclaiming the return to republican government. With the confession of sin common to the rulers of eastern Asia, Yuan took upon himself "all the faults of the country," and especially the blame of

not opposing the monarchical movement with proper vigor, and officially canceled his official acceptance of the throne on 11 Dec. 1915.

To the judicially minded student, surveying the long perspective of history and seeing that China has attempted or passed through almost every form of government known to man, while still preserving the body social intact, two or three things seem plain: (1) that China is an anvil that will wear out, by passive resistance, every hammer that beats it (and Japanese know this far better than Occidentals); (2) that it makes far less difference to her millions what the frame of government may be, while the social bond is so strong and local freedom, as heretofore, is maintained; and (3) that so long as China's classic literature endures, pure despotism cannot exist and the spirit of liberty will survive all native dictators or foreign conquerors.

In local matters, the Chinese are as well fitted for republican government as are any other people, but how to generate sufficient power at the centre is still a problem. One may summarize the needs of China as (1) a strong central government; (2) a separate and honest judiciary; (3) a uniform currency; (4) development of her natural resources; (5) elementary education; (6) public works; (7) absolute freedom in religion; (8) philanthropic reform.

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WILLIAM ELLIOT GRIFFIS,
Author of 'The Mikado's Empire'; 'China's Story,' 'The Mikado: Institution and Person,' etc.

CHINA, Diplomatic Relations with. American intercourse with China began in 1784 with the arrival of the *Empress of China* near Canton, which for a century had been the only port open to foreign over-sea commerce. The supercargo of this vessel was Samuel Shaw, who was appointed first American consul at Canton by John Jay in 1786, and was later reappointed by Washington in 1790. For over half a century, American commerce (largely via the Northwest coast and Hawaii) continued with no official supervision beyond that of an American trader acting as consul without salary, and without recognition as an accredited representative by China. The opening of American diplomatic relations with China, necessitated by the steady increase of American enterprise and interests in the Pacific and the Far East — which finally attracted the protective and encouraging attention of the American government to favor new enterprises, as illustrated by the famous Wilkes expedition of 1838–42,— was more directly the result of the British attack on Canton in 1840 in a demand for trade as a right, and of the subsequent treaty of Nanking which accorded to the British privileges of residence at five ports and ceded the island of Hongkong. Caleb Cushing, appointed commissioner and envoy extraordinary to China by President Tyler in 1843, arrived at Macao in an American steamer, in February 1844, en route to Peking; but, yielding to the arguments of the Chinese governor against the propriety of the trip, he awaited the arrival of Tsiyeng, the Emperor's commissioner. In July 1844, he negotiated the treaty of Wanghia granting privileges of trade and residence at five ports, of extra-territoriality, of most-favored nation, of reception of consuls by Chinese officials on equal terms, and of direct diplomatic correspondence with Peking. It also established port regulations. For over a decade after the ratification of the treaty, successive American commissioners or ministers —Alexander H. Everett, John W. Davis, Humphrey Marshall, Robert W. McLane, Peter Parker — maintained legations, without personal interviews with the tranquil, elusive Chinese commissioner, who directed foreign affairs by literary conventionalities and masterly inactivity. Attempts to communicate directly with the Imperial government at Peking were without success. Meantime, Americans shared in the series of irritations and annoyances from the failure of treaty stipulations which culminated in the *Arrow* affair of 1856, causing England to declare war — in which France joined, but to which the American government refused to become a party. Marshall who arrived in 1852 at the culmination of the Taiping revolt found Yeh, the Imperial official, too busy to talk or to do more than to trifle through literary excuses and evasions. McLane (1853–54), was as unsuccessful, and found the insurgent chiefs even more elusive; and, after a fruitless conference with the Imperial commissioner, recommended co-operative coercion by a united Anglo-Franco-American fleet. Parker (1855–57), also failing to bring Yeh to a personal interview, promptly recommended the "contemplated plan of concurrent action" with Great Britain and France, and later suggested the American occupation of Formosa as a means of securing satisfaction; but the American government remained neutral, hesitating to become involved in hostile demonstrations.

In 1857, experience having shown the necessity of a revision of the treaty and a more rigid enforcement of its provisions and the British and French having invited the United States to aid their demands on China by armed co-operation, the American government ap-

pointed William B. Reed with instructions to co-operate with the allies only by moral support and peaceful means, but to demand suitable guarantees for trade protection and diplomatic residence with direct diplomatic intercourse at Peking. Mr. Reed was unable to induce the tranquil, arrogant Yeh to meet him, or to recognize the need of a change in the treaty. Overcome by Yeh's literary skill which seemed to elude any form of literary retaliation known to the western mind, he concluded that vigorous coercive action was necessary to secure redress. Finally, accompanying the British and French fleets to Taku, and thence to Tientsin, after the Anglo-French hostilities which he had tried to prevent, and aided by Dr. W. A. Martin (a missionary), he negotiated a treaty (signed 18 June 1858), granting the opening of new ports, the right of direct correspondence with the privy council at Peking and the annual visit of the minister under certain restrictions, and recognizing somewhat apathetically the right of Christians to practice and quietly teach their religion. Later, at Shanghai, he negotiated a supplementary convention for regulation of trade and revision of tariff. He also secured by convention an indemnity of $735,000 in satisfaction of claims of American citizens for damages by the recent war between China and Great Britain. Less than half this sum was subsequently awarded to claimants by the American commission; and in 1885, Congress rather tardily voted the return of the unexpended balance — an unusual event in international relations.

In 1859, ratifications of the Reed treaty were exchanged by J. E. Ward at Pehtang on the coast, after a fruitless attempt to have the ratifications exchanged at Peking as provided in the treaty. Although Ward reached the capital, and was entertained there with imperial munificence, he could obtain no audience with the Emperor without the humiliating *kotow* before the throne, and he refused to grovel, prostrate himself or kneel. He was criticized for retiring from Peking, but was sustained by his government.

The United States had no share in the Anglo-French expedition of 1860, which obtained the establishment of permanent legations at Peking and resulted in the creation of a new Chinese board, the Tsung-li-yamen, or foreign office.

In turning the tide of war for the suppression of the Taiping insurrection which for ten years desolated the country, China recognized the valuable services of an American, Frederick T. Ward (predecessor of Charles Gordon), who fell at the head of his men in 1862 and was awarded posthumous honors by the Emperor. Anson Burlingame, appointed minister in 1862, was the first American representative to reside in Peking. He was successful in a policy of peaceful forbearance and co-operation in diplomatic action. By securing the co-operation of other diplomatic representatives, he aided in preserving the integrity of China in the final crisis of the Taiping revolt. He also aided China in the suppression of the coolie trade and negotiated with the Tsung-li-yamen for a treaty requiring freedom of immigration. After he left the American diplomatic service, in 1867, he was chosen by China as a representative to all the great foreign powers with which China had treaty relations, and especially to inaugurate diplomatic relations with the western world. In 1868, when California and other parts of the Pacific Coast still welcomed Chinese labor for the development of resources, he negotiated with Secretary Seward at Washington the Burlingame treaty, which recognized the right of citizens to change their home and allegiance, and the mutual advantages of free migration and immigration, and guaranteed every privilege and complete protection to Americans in China and equal rights to Chinamen in the United States. In 1872, two years after a furious anti-foreign riot at Tientsin, China began a new policy by sending a number of young men to be educated in the United States, a policy which she later abandoned because of the danger of estrangement from Chinese institutions. In 1876 China sent her first resident ministers to the United States and other powers.

To meet objections to the immigration clauses of the Burlingame treaty — objections resulting from a reversal of feeling on the Pacific Coast after the completion (in 1869) of the first overland railroad (which brought laborers from the eastern States) and culminating in California during the disorder attending the railroad strike of 1877 — the American government appointed the special Angell commission of 1880 which negotiated the Peking treaty of November 1880, modifying the Burlingame treaty by a clause providing for regulation of the admission of Chinese laborers. This treaty began a policy of restriction and exclusion, to which Congress quickly responded by an act of 1882, suspending the admission of Chinese laborers for ten years and requiring certificates from other Chinese. The act of 1882 was amended in 1884 by more stringent provisions, and again in 1888 by the Scott act which was criticized as an abrogation of the Chinese immigration treaty of 1880 by indirect legislation, and also as a legislative intervention while a newly negotiated treaty to adjust the matter was pending ratification at Peking, The Chinese minister criticized the Scott act as a disregard of treaty obligations and later made a strong protest against the new act of 1892 (the Geary law) which continued previous acts in force for ten years. By these acts American trade interests and opportunities were jeopardized.

The American government later made amends for the Scott act by payment of long-pending claims of Chinese laborers, and by the negotiation of the treaty of 1894 which accepted the main provisions of the abortive treaty of 1888 and reconciled the differences between the two governments. In 1904 China terminated the treaty of 1894, and soon thereafter Congress re-enacted without term all existing laws. Meantime relations improved. There were new sources and evidences of better feeling. In 1895, at the close of the Chinese-Japanese war, ex-Secretary J. W. Foster of Washington was appointed by China as counsel in the peace negotiations at Shimonoseki. In 1899, following the American acquisition of the Philippines, Secretary Hay, refusing to participate with other powers in the «sphere of influence» or partition policy in China, proposed the policy of the open door,

equality of opportunity, maintenance of territorial integrity and autonomy.

In 1901 the United States co-operated with other foreign powers represented at Peking in compelling China to make amends for aggressions attending the Boxer outbreak of 1900. American influence with other powers reduced the money indemnities first proposed. The amount finally imposed, largely through German influence, and against the advice of the American representative, was still excessive, greatly exaggerating private claims. In 1909 the United States remitted to China $16,000,000, the unclaimed portion of the American share of the indemnity — which the Chinese government arranged to use for educational expenses of Chinese students in the United States.

The Chinese republic of 1911, the culmination of a revolution precipitated by the creation of railway systems built on foreign loans, was recognized by the American government in May 1913, after the disappearance of the Imperial government of the Manchus (1912). The diplomatic representatives of the United States and the five great powers backed a combination of bankers of the six powers formed to advance money to the new republic; but, in March 1913, after considerable negotiation to secure an agreement from China for satisfactory security and supervision of expenditures as a condition of the loan, the American government announced its withdrawal from the group.

In 1915, China took an important step in the development of trade relations by the appointment of a trade commission to the United States. In June 1915 she took an important political step in the appointment, by President Yuan, of Pres. F. J. Goodnow of Johns Hopkins University, an American expert in problems of government, to act as constitutional adviser of the Chinese government. In 1916, the Chinese government selected as Dr. Goodnow's successor Prof. W. F. Willoughby of Princeton University who was later succeeded by Prof. W. W. Willoughby of Johns Hopkins.

American leadership is disclosed in a long list of interlocking obligations in regard to China, expressed since 1900. The American government has shown no inclination to abandon political interests in China or to shirk responsibility in the continuance of the principles of the Hay doctrine, the logical sequence to all earlier diplomatic relations. Following the Japanese demands on China, which were granted in large part by the China-Japanese treaty of 25 May 1915, it announced that it could not agree to any action which might impair American-Chinese treaty obligations, or the open door, or Chinese integrity. In 1917 it reached an agreement with Japan on questions relating to Japanese policy in China. Late in August a special Japanese mission armed with full power, headed by Viscount Kikujiro Ishii arrived at San Francisco to secure a better understanding between the two countries.

By an agreement of 2 November between Secretary Lansing and Viscount Ishii, the United States government consistent with the principle of the American Monroe doctrine, recognized that Japan by territorial propinquity had special interests in China, and obtained from Japan a recognition of the principle of the open door and a denial of any purpose to infringe in any way on the independence or territorial integrity of China. Although the recognition of special Japanese interests conceded no right or authority over the destinies of the Chinese people, and was joined with the guarantee of China's independence and integrity, and although the pact was justified by China's feeble condition as a sovereign state, the Chinese government made a formal protest stating that it "will not allow itself to be bound by any agreement entered into by other nations" in which she has no part.

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JAMES M. CALLAHAN.
Professor of History and Political Science, West Virginia University.

CHINA, Educational Progress in. It was admirable wisdom, indicating no little courage, for China to reform its venerable system of education. Less than a year after the Treaty of 1860, Dr. Martin writes in his 'Lore of Cathay,' "large bodies of Chinese troops might have been seen learning foreign tactics under foreign drill masters, on the very battle grounds where they had been defeated. But happily China did not confine itself to a reform of war methods. It took steps to modernize its entire educational system, not in one bound, which would have been too radical, but in a series of measures extending over a few decades, that were safer and more effective for a nation of such antiquity, whose scholars, in charge of its government, were chosen for more than 12 centuries by competitive examinations."

The first step was establishing in 1862 a school for training official interpreters, as the necessity of studying foreign languages and literatures — English, first, then French, Russian, German, and in 1899 Japanese — became keenly felt. The school grew into a college in 1866, with the number of students increasing in 1910 to 120, departments in law and science being added. Dr. W. A. P. Martin was president for 25 years. Two auxiliary schools were opened later at Shanghai and Canton. Naval schools rapidly followed, with a Naval College at Nanking in 1896, a government mining and agricultural college at Wu Chang in 1892, a telegraph college at Tientsin in 1879. Despite some opposition on the score of disloyalty to Chinese tradition, an education commission was appointed in 1871 to send 120 students to the United States for training in four-year instalments of 35 students each for 15 years — though all were recalled in 1881. Most of them, according to the educational number of the *East of Asia*, later served in various government positions, medical, telegraph, torpedo, and otherwise. As early as

1871, Li Hung Chang advocated the Tientsin University, which was organized in 1896. Besides preparatory classes in English, etc., a four years' course was arranged in the schools of civil and mechanical engineering, mining and law, the Boxer outbreak, with the German occupancy of the buildings, abruptly closing the institution.

The Nan Yang College came next in 1897 at Shanghai, whose students, with the elements of Chinese education, were to receive a thorough course in English and Western Sciences, preparing also for the government competitive examinations. In April 1907 it became an imperial polytechnic college. Throughout the nation more and more enthusiasm for further reforms was aroused. Before the close of the century all schools where western science and language were taught were overcrowded with students. Reform clubs arose in increasing numbers. The young Emperor was a zealous student of foreign writers and thousands of scholars followed his example. The edicts in 1898 and sweeping reforms under his sanction made China definitely progressive despite the wave of reaction that imprisoned the Emperor and put an end to many reforms and reformers for a time. The Peking Imperial University alone remained. After the Boxer outbreak, however, and on the return to power of the Empress, she adopted a more liberal course and resumed the work of reform. Not only did she abolish old methods for examinations, regulate the education of students abroad, and provide more thorough instruction in history, politics and western learning, but she opened new colleges in 1901–02 in 10 provinces, instituted normal colleges and had commissioners sent to various countries to study their systems of education, commerce, agriculture, manufactories, armies, marine, etc. Boards of education were appointed in various provinces; lecture halls opened, middle schools established, the University at Tientsin begun anew in 1903, and night schools were started for officials to study English. In Chihli province alone in 1906 were 35 lecture halls 3 technical and special schools, 21 normal, 24 middle, and 166 boys' higher primary schools.

The controlling authority of the Chinese system of education is vested in the minister of education at Peking, created by imperial decree in 1905. There are five subordinate departments: general supervision, professional, general and technical education, and finance. Boards of education exist in every province with educational clubs. No effort is spared to train the people along the lines of modern education. The course of study in the lower primary is five years, with kindergarten for children from two to six, taught by specially trained women. Apart from the middle, high schools and provincial colleges and universities there are normal schools and colleges, and numerous miscellaneous schools, technical, industrial, law, military and a few medical. A police training school was organized in Tientsin in 1902 and was followed by others elsewhere. Great changes for the better have been instituted in prison life. There are now 'model prisons' with schools, and reformatory schools in several provinces. The facilities for the education of girls, for whom formerly no provision was made, are extending rapidly. In 1908 Peking opened its first women's normal college and the girls' schools are revolutionizing the people's home and social life. The custom of binding the girls' feet cannot continue, as the government will not admit into the schools any girls so bound.

China is most liberal to its students studying abroad. Those sent to the United States receive $960 yearly. In gratitude for the return in 1908 of over ten millions of the Boxer indemnity, China pledged itself to send to the United States 100 students each year for four years and 30 thereafter for 28 years, all to be chosen without regard to province, race or religion. The Tsing Hua College, near Peking, was opened in 1911 and after a brief interruption, a year later instruction was resumed. Here students are trained before being sent to America — a direct outcome of our government's generosity. In 1913–14 Tong Kaison, a Yale graduate, was president, and Tsur Yetsung, with degrees from Yale and Wisconsin, dean. It has a high and middle school course, a Chinese and an English department. Provision is made for physical exercise and athletics. Its team represented China and the college in the Far Eastern Olympic Games at Manila only two or three years ago. China's half century struggles for reform in education have succeeded despite almost insurmountable obstacles. Perfection has by no means been reached, but the outlook is hopeful from the popular enthusiasm for the new system. All depends on the character and calibre of the men who have returned or who are to return from abroad, to solve the problems which remain.

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CHINA AND JAPAN. When in 1823 in response to the Russian ukase claiming exclusive possession of the Pacific coast of North America to the 51st parallel, John Adams told the tsar's minister, Baron de Tuyl, that "we should contest the right of Russia to any territorial establishment on this continent, and that we should assume, distinctly, the principle that the American continents are no longer subjects for any new European colonial establishments," he not only gave the first clear expression in action to the Monroe Doctrine (q.v.), but he unconsciously perhaps dictated the future history of the Pacific Ocean and in large measure the peaceful progress of China and Japan through American influences. Thus ushered into the world's politics, the United States, after resisting the tsar's demand and by diplomacy alone forcing it back to parallel No. 55, prevented the Russian advance southward in America, and later gained California, Alaska and the Aleutians with a vast front on the Pacific, then whitened by whaling and trading ships. Once California and Oregon were ours, the incentive was quickly given to tap the markets of Asia and awaken the hermit nations to commerce. After Monroe came Fillmore. The latter, on the day that Mutsuhito (q.v.), the late emperor of Japan, was born, 3 Nov. 1852, ordered Commodore M. C. Perry (q.v.) to proceed, by the shortest route — around the Cape of Good Hope — to Yedo Bay to negotiate a treaty.

Perry's triumph was a «brain victory,» won by tact, patience and consummate knowledge of human nature and especially of the Japanese variety of it. He opened a new era in the treatment of Oriental nations, showing how, apart from force, the door of international brotherhood might be opened. On the spot at Kurihama, where, in 1853, stood the pavilion for the reception of the President's letter, rises to-day in Perry Park the memorial monolith inscribed in gold by Marquis Ito (q.v.), to the erection of which the Mikado, leading his people, subscribed. At Yokohama, where the conferences of Commodore Perry and Professor Hayashi were held to discuss ethics, humanity, and treaty business, and the first industrial exhibition in Japan of American tools, inventions and products was held, the United States consulate and the Union Church have been upreared. Thus led forward, the hermit Japan entered the school of experience, whence she was to emerge as the pupil of the Anglo-Saxon nations and the champion of their principles in Asia, the teacher of China and the middle term between the civilizations of the Orient and the Occident. After her own political commotions, consequent upon the clash of old and new ideas, Japan from 1870 engaged the service of hundreds, yes even thousands, of Yatoi (hired specialists) from America and Europe, to rebuild the foundations of the empire, and for 30 years, besides sending thousands of her sons abroad, put herself under the tuition of an army of teachers from western countries, who were active in every department. Yet what has been phenomenally true of Japan has been, in the working of leaven, true of China also, only her larger mass hindering the visibility of real progress. Perry's success with Japan really opened a new era in the whole Chinese world of eastern Asia. The spirit of America's commerce, education, diplomacy, missions and the political policy of the United States have been the greatest factors not only in the awakening of China, but in influencing and regulating the policies of the aggressive European nations in their dealings with China and the neighbor nations of the Far East. Japan, contrary to popular notion, is a very young nation, being, according to the unanimous verdict of critical scholarship and all the evidence in hand, no older than the Germanic nations, coming to national self-consciousness in the 5th century of the Christian era. Naturally then she has taken quickly to western culture in the 20th, as in the 5th and 15th century. The Chinese, being an old race, with all the limitations of senility are more slow in their mental movements than the Japanese, who show all the peculiarities of a young race. Yet in both empires progress, through the combination of old and new forces, has been real.

Surveying the past 50 years and especially what has been done within the 20th century, it is well to show still further wherein the Chinese and Japanese are alike or different from each other, and also wherein they have human traits in common and systems in harmony with or in contrast to the nations of the West. We may appraise changes actually wrought and see how far these movements or evolutions are to be attributed to agencies within or without these countries. There are those who consider Japan almost wholly a self-reformed nation, while others think that all transforming agencies have come from without. The truth lies in the golden mean between these extremes of opinion. China's vastness of area and density of population prevent even keen western observers and students and certainly the average Occidental, from any clear perception of leavening principles and transmuting elements within so large and venerable a body politic. They may note what is phenomenal, while they are usually blind to the psychic changes in the Far East. Hence, for example, the real energies of the native secret societies and sects within the Chinese empire cannot be definitely gauged, yet that they have been for centuries a real force, frequently showing themselves in both bloodless and bloody manifestations, the Boxer insurrection of 1900 and the Republican revolution of 1912, demonstrate. That these sects yet exist in great potency is certain. Until western diplomatists discern that China, equally with Turkey or Russia, and what survives of old Japan, is a church nation, with a fixed creed upheld by the government and maintained by force, and that China always has been, and is still, a persecuting nation, there can be no sound diplomacy. Failure to see this adds mystery to the Chinese problem and accounts largely for the discreditable surprise at the Boxer outbreak in 1900, foreseen by the missionaries, but to the approach of which so many diplomatists in Peking were blind. This politico-ecclesiasticism, based on the Confucian writings and philosophy, is the foundation of a social system that has survived the fall of over 30 imperial dynasties, and is still the most potent check upon and the choicest weapon of government, whether by pure Chinese or alien rulers like the Manchus were. Hence to attack that dogmatic system is treason in a native, a horrible offense in a foreign missionary, and only tolerable in the Mohammedans because they are so numerous and powerful. The maintenance of this dogma by the sword of the normal magistrate, himself *ex officio* an orthodox Confucian, has been the cause of persecutions during the ages with bloodshed abundant. This is the real reason of so many reactions and of repeated disappointments. China has again and again raised hopes among Occidental people that she was about to modernize her laws and people, only to dash the expectation of optimists to the ground. Even in this 20th century she has, after founding schools and universities, apparently on modern lines, even appointing American and European officers and teachers, cast these persons aside, and neutralized their methods, ostensibly because natives or Japanese were preferred, but in reality to maintain her dogma of Confucian orthodoxy, because the degrees from Peking demand adherence to Confucianism. Whatever modifications China has made in her system are as yet simply external, nor will there be any real progress in the western sense of the word until Chinese bigotry and persecution are abandoned and the union of church and state given up. The plea of China is that innovators under the pretext of progress are seditious and that reforms by natives mean revolt, anarchy, and destruction of established government. But this is only another phase of that Chinese indirection of mind, which Dr. Arthur Smith in his book on 'Chinese Characteristics' has exposed with such masterly skill. The certainty of the Chi-

nese union of church and state, the instances of bigotry and bloody persecution, and the great slaughter of Chinese in the name of orthodoxy during past ages, making the Chinese government a shedder of blood for opinion's sake, quite equal to Russia or the mediæval states of Christendom, are shown by that life-long scholar of Chinese, J. J. M. DeGroot of Leyden, in his monograph, 'Sectarianism and Religious Persecution in China.' In weight of scholarship based on original research this work outweighs all that has thus far been written on the subject of China's politico-religious status. In the future these sects will doubtless play a very important part, and probably with more effect on China's internal structure, than either the Tai Ping rebels or the "Boxers" (q.v.). Such possibilities must exist as long as China represses thought and opinion for conscience' sake by her absolutism in religious matters. Nor is it likely that she will find any better solvent for her problems than the complete separation of church and state and the granting, not only of academic freedom, but of perfect liberty of conscience to her people. So long as she refuses to grant such liberty, both in the school and to the masses, there will be no end to internal disorders and to foreign complications. In this matter of self-reformation, as the past has already proved, the elements tending to reconstruction and the evolution of the Chinese along more modern lines are most likely to arise from among the natives who have been educated or helped by the teachers from foreign countries. The overwhelming majority of such men of modern mind are Christian, though others are far from lacking. Almost all the knowledge of China by the western world comes from aliens, who have studied, surveyed, and described the country, and who in addition to propagating their dogmas have given the Chinese pretty nearly all the exact science they possess. One cannot ignore the services of those physicians, engineers, advisers, financiers, customs officers, who, with or without Chinese pay, have for a century or more served China's people. It was an American, Ward, who showed the possibilities of the Chinaman as a soldier. What other Americans have done in China is set forth in the book 'America in the East.' It was an American, S. R. Brown, "A Maker of the New Orient," for example, who established the first (Protestant) Christian school in China, brought the first Chinese students to America, and demonstrated the ability of the Chinese youth to absorb western learning and methods. Among his pupils was Yung Wing, who, after graduating with honors from Yale College, brought to the United States under government patronage, six score Chinese lads as students, one of whom, Sir Liang Chang, has since been Chinese envoy at Washington. In a word the efforts of the lay and clerical teachers, helpers and healers of the Chinese, especially since the opening of the ports, and within the last 60 years, reveal a force that has in the peaceful American, rather than the conquering European, way helped to give credibility to the prophecy of one of the greatest of China's foreign teachers, S. Wells Williams: "The regeneration of China will be accomplished like the operation of leaven in meal, without shivering the vessel."

The Japanese are not compacted wholly of Oriental stuff. They differ from the Chinese physically and psychically. Though they form a race having in it many elements, Tartar, Korean, Malay, Nigrito, etc., their basic aboriginal stock, the Ainu, is very probably a branch of the Aryan family of humanity, and the Japanese are thus allied in some measure with the "white" races. In mind and temperament they differ from the Chinese, not only as insular people dwelling on volcanic soil constantly shaken by earthquakes may be supposed to differ from continentals inhabiting stable lands in river valleys, but also in culture and aims. So long as that half of Asia dominated by Confucian and Buddhist culture was virtually isolated from Christendom and the West, the nations of China, Korea and Japan were hermits, who had little to do with each other. The activities that mark Occidental diplomacy were unknown. It was Japan's frank facing modern requirements and her determination to shirk no responsibilities that compelled China to awake from her sleep and aloofness. Her release of the Chinese coolies, in Yokohama harbor, from the Peruvian ship *Maria Luz*, in 1873; her descent on Formosa to chastise the murderous savages in 1874; her treaty with Korea in 1876 and recognition as a sovereign state, stirred China to look after her own people abroad, to recognize international obligations by establishing legations and consulates. Finally, China even yielded to General Grant's suggestion in 1879, to settle the irritating matter of the Riu Kiu Islands by a joint high commission. Unfortunately, however, race pride, colossal conceit and a chronic tendency to reaction prompted China in August 1880 to cancel the treaty commission, a proceeding which so outraged Japan that Japanese statesmen foresaw war with China and began to prepare for it.

When in 1894, this war broke out, it was evident that both nations had made vast progress in both material civilization and in those gains which are associated with the triumph of mind in law and morals, revealing clearly by startling contrast both the homogeneousness and thoroughness of the progress of the smaller and the looseness of organization in the larger country. Japan, quickly responsive to a central will, seemed like an athlete in possession of all his powers, while on the other hand there was with "the boneless giant" progress only in lines and spots, the work of partially modernizing China having been chiefly that of a few resolute men, while the great body politic seemed to be insensitive and vigorous for offense and defense only in portions. Strictly speaking, there never was any war between Japan and China, but only a war between all Japan and a few of the maritime provinces of China. The American, Ward, and the Englishman, Gordon, had shown what the average Chinaman could make of himself as a soldier, when properly drilled, commanded and influenced by example. Under these men, Li Hung Chang (q.v.) was converted to the value of the material forces in western civilization. Adopting these, and being viceroy of provinces nearest to the capital, he organized an army drilled by German officers and had the promontories of Wei-hai-wei and Port Arthur, guarding the sea gates of the capital, fortified and the Taku forts commanding the Pei-ho River rebuilt according to

modern principles of defense and engineering. Gradually an efficient fleet of battleships, cruisers and gunboats was organized. A beginning had also been made in China of railways and steamship lines. One part of China's vast system of revenues, "the imperial customs" of the empire, elaborated since 1863 under the British Sir Robert Hart and honestly administered, has given China her surest source of cash income for general purposes and the purchase of foreign equipment of every sort. For an individual or government service to be free from bribery and routine corruption seems to the normal Chinaman something unearthly, and the imperial customs under Sir Robert Hart have won unbounded admiration from the Chinese. In 1894, when the war broke out which did so much to prick the bubble of Chinese prestige of greatness and mass, and which, paradoxical as it may seem, evoked mutual respect and drew the Chinese and Japanese more closely together in reciprocal understanding, China had, in addition to her military mobs in the various provinces, the beginnings of scientific military system. This in time might have become national. Even then as seen to undiscerning foreigners China appeared from a military point of view invincible. On the humane side of provision for sick and wounded soldiers and in the nobler features of civilization, China was woefully deficient. As soon as hostilities broke out the vast difference between the two nations was manifest. China went to war without surgeons, hospitals, nurses or the manifold apparatus of civilization for protecting non-combatants, saving life and mitigating the horrors of war. China had not yet become a signatory to any of those conventions of nations in the interests of mercy, nor was there a Red Cross organization within her borders. Her recognition of the international code of war was slow and her acceptance of it slight. On the contrary Japan, having her object lessons given by Christian missionaries, had provided hospitals, surgeons, Red Cross Society and equipments for surgery, healing and hygiene, and these were in splendid condition, while 1,400 trained nurses were ready for work. Japan had in 1887 signed the Geneva and other conventions and had diligently educated her army officers in the commentaries and usages of the signatory nations, while her naval commanders were well versed in the laws of search and capture. When in 1894 her fleets and armies went forth into Korea, Manchuria and China proper, there was with each field-marshal, besides a hospital corps ready to minister to friend or foe, an expert lawyer, versed in international law, who went as adviser to see that nothing was done by the Japanese which should infringe the laws of nations. Two notable books, 'International Law During the Chino-Japanese War,' by S. Takahashi, and 'La Guerre Sino-Japonaise au Point du Vue du Droit Internationale,' by Professor N. Ariga, the one from the military and the other from the naval college in Tokio, are the literary monuments of this habit of the Japanese, which, in 1904, has developed into a college of five international law experts. These, after being consulted at all points during the progress of the negotiations of 1903–04, have gone upon deck and field with the military and naval men into Manchuria to insure, in every detail, harmony with the laws of nations.

The war of 1894–95, which wrought such great results for the world at large, is worth reviewing in its main outlines, since it blew to pieces and forever China's doctrine of Whang-ti, or world-sovereignty, the tenacious adherence to which over Korea had brought on the war. After being again served by China as they had been in the Riu Kiu matter, the Japanese determined to take no further chances with her rulers. In Korea, after the bloody struggle in Seoul between the native Liberals and Reactionaries in 1884, followed by the armed conflict between the Japanese and Chinese troops, a convention was made dated 7 May 1885 between Li Hung Chang and the Marquis Ito, that both governments withdrawing their troops would not again land soldiers in Korea without mutual agreement. For awhile there was peace in the Land of Morning Calm, but when the Tong Hak uprising took place, the soldiers from Seoul were overcome and the whole kingdom seemed to be in danger of anarchy, the pro-Chinese faction at court asked for aid from Peking to put down the rebels. Then to the amazement of the world the Chinese government violated the treaty of 1885 by first forwarding troops and then notifying the Japanese minister in Peking, using the words "our tributary state" concerning Korea. China thus reasserted her ancient claim of suzerainty over Korea as a vassal state, notwithstanding that Korea had been recognized as sovereign and independent by Japan and other nations. The government in Tokio interpreting this as a direct insult, on 12 June 1894 announced the despatch of a body of troops under strict discipline to Seoul and five days later invited China to undertake with Japan financial and administrative reforms in Korea in order to preserve the peace of the Far East. The Peking government curtly refused and demanded the recall of the Japanese troops. The reply from Tokio was that pending an amicable settlement of questions in dispute, any further despatch of Chinese forces into Korea would mean war. China had already ordered her soldiers in Manchuria to cross the Yalu River and having chartered the British ship *Kow-Shing* despatched 1,100 soldiers to reinforce the Chinese camp at Asan in Korea.

What follows the world knows. With astonishing secrecy and celerity, the armies of Japan occupied Korea and after the decisive battle of Ping Yang drove the Chinese out of the peninsular, crossed the Yalu and in Manchuria conquered an area larger than their own empire, while her navies wiped the Chinese fleet off the ocean and captured the great fortresses of Port Arthur and Wei-hai-wei. After annihilating nearly all the drilled troops of China at Ping Yang, the Japanese fought military mobs, making war chiefly with the forces of only a portion of the empire. During the war the majority of the Chinese people scarcely knew that there were any real hostilities adverse to their empire, nor did they learn for years afterward just what had happened, but the military success of Japan opened the eyes of Europe and enlightened some of the Chinese mandarins and scholars. To-day we find China with a new army, formed on modern principles and drilled chiefly by Japanese officers, while in

June 1904, having become a signatory to the Geneva and other conventions made to mitigate the horrors of war, she has entered still the pale of civilization, which means the world in brotherhood.

The Japanese stung to the quick, because neither China nor western nations had recognized them as highly civilized people, were confirmed in their pride and resolve to make the so-called white race understand and appreciate them, when Russia, France and Germany joining to deprive them of the lawful fruits of conquest, forcibly compelled them to be satisfied with the cession of Formosa and indemnity in money. Had the Japanese been possessed of four battleships, they would in 1895 have declared war against Russia. As it was, they who never forgive an insult, resolved to nurse their wrath, keep it hot by buying battleships, and in cool science and unwearied perseverance began to invent explosive powders, perfect munitions and equipments and enlarge an army and a fleet that should some day wipe out the insult and show that the Japanese count none on earth as their superiors. Meanwhile, China, profiting by her fresh experience in humiliation, began to inquire more earnestly into the secrets of western power. A tremendous impetus was given to the reading of all kinds of information about Japan and the western nations, to the building of railroads and to the renovation of educational methods. The ferment of ideas caused something like a great reform movement in 1897, which, led by progressive literati and apparently sanctioned and even controlled by the young emperor, seemed apparently about to sweep over the whole empire. New schools and universities were planned and a newspaper called *Chinese Progress* was published. The purchase and sale of official rank was to be abolished. The stirring and patriotic brochure "China's Only Hope," recommended by the emperor, fed the flaming zeal of the reformers who were led by Kang Yu Wei. Even the abolition of the queue, the changing of the Chinese national dress, the adoption of the Christian religion, the calling of a national parliament and a journey of the emperor and empress dowager to Japan to see for themselves the pitiful condition of China were advocated in memorials. Reform seemed to be ready to spread like a prairie fire, when suddenly in September, Li Hung Chang was dismissed from office and the Emperor virtually dethroned by the Empress Dowager. This act "carried within itself the fruitful seeds of the Boxer outbreak." Yet although the missionaries felt what was in the air, the diplomatists looked on the episode as a "Manchu family quarrel," and ignored the warning of those living close to the masses of the people.

Meanwhile the disturbing influence of American prosperity and expansion were felt in both Europe and Asia. Within a year after Pittsburgh achieved the supremacy of the world in the making of cheap steel, Russia, Germany and Great Britain "precipitated themselves upon the shore of the Yellow Sea, grasping at the positions which had been conquered by Japan and for the same reason,"— to obtain possession of the rich coal and iron deposits in Shansi, said to be "worth ten Pennsylvanias." Germany seized Kiao Chau, Russia Port Arthur, and Great Britain Wei-hai-wei, in readiness for the supposed impending "Break-up of China" and its expected partition. The torpedo that sunk the *Maine* in Havana harbor interrupted the European program, postponed the partition of China and united the British, Americans and Japanese in the determination to keep China intact and the door of commerce open. In 1900 the United States, now a world power, was in Asia with force and had a policy — the policy of freedom and uplift — which for a century or more, the Americans in Asia, as traders, teachers, healers and apostles of democracy and fair play had been steadily developing. Meanwhile in China the old territorial integrity could not be so ruthlessly violated nor the ancient social systems invaded without protest. The introduction of railways had thrown thousands of men out of old methods of employment. The tremendous commercial intrusions, which disarranged old customs and made the problem of livelihood to millions so very serious, brought on a fierce reaction both of the scholars and the people and especially of the Buddhist priests, creating an atmosphere and environment most favorable for the outbreak of another of those sectarian revolts against the official orthodoxy of China, to put down which the Chinese have shed more blood perhaps than all the religious wars and inquisitions of Europe. This time the heresy was joined with and the cry raised in the name of patriotism. The heretics became the people called "Boxers" or the Fists of United Harmony. The triple pressure of hunger, superstition and patriotic revolt at the territorial incursions of the foreigner at last burst out into a storm, which in blind wrath against everything alien, smote first the railways and foreign workmen and then the teachers of the foreign religion and their converts. The mob reached Peking and surrounded the legations, which were hastily isolated, fortified and for months successfully defended. The foreign powers hastily made preparation to defend and then succor their nationals, but the United States seemed to be the only one that beside its prompt despatch of a military force had a definite policy, which was in recognition of the sovereignty of China to relieve its own citizens and then withdraw its military from Chinese soil. It is absurd to suppose any real harmony or co-operation between the orthodox Chinese government and the heretical Boxers. Whatever may be one's opinions on the subject or the form of the encouragement alleged to have been given directly by the Empress Dowager, it is a fact that no hostile shot was fired by a Chinese regular soldier or sailor, until the seven allied nations, in which the Americans were not included, had made war on China by firing on the Taku forts, 17 June 1900. Against this unwarranted proceedings and overt act of war the American Admiral Lewis Kempff protested and in the crime of attacking peaceful Chinese he refused to participate, his conduct becoming the basis of the triumphal diplomatic policy of the United States government. Briefly stated, the situation was this: A riot of fanatical sectarians, moved by economic and patriotic motives, rose in rebellion against the government already impoverished and weakened by foreign aggression. When unable to put down the uprising in Shan-si, the Pei-ho valley and the vice-royalty from which Li Hung Chang had

been removed — though the whole Boxer movement was wisely handled and thoroughly suppressed by able viceroys in the central and southern parts of China — the seven allied nations made war on China in the bombardment of the Chinese forts. When also the Chinese, of course, attacked their enemies in Siberia, the Russians perpetrated the massacre at Blagovestchenk and then marched their soldiers to Peking. The combined relieving force fought the opposing Chinese. The Japanese, having the largest and best furnished of the contingents, led the van. The Russians as very slow marchers came next, so that the Americans and British contingents had to march during the hottest hours of the day. It is certain that the celerity, character and discipline of the Japanese soldiery on this expedition excited the surprise and admiration of military critics of every nation represented, while on the other hand the familiarity of the men of Nippon with those of Muscovy bred contempt of Russian slowness, heaviness and low grade of intelligence in the *mujik* or common soldier of the tsar.

After the capture of Tien-Tsin 14 July, the Japanese or Americans alone could then have pressed on and relieved Peking within a fortnight, but jealousies and unnecessary delays kept the relieving column idle until 4 August. The unspeakable robberies, violation of women, brutalities and generally barbarous conduct of the most of the European troops, by the way and in the capital, demonstrated the hypocrisy of the claim to be called Christian and in contrast to the conduct of the Japanese proved that the terms "Oriental" and "Occidental," as applied to morals, are purely traditional and destined soon to pass away. The Imperial city was captured on 15 August, the Chinese court escaping to the westward remained wholly away from Peking until January 1902. On 28 August bodies of soldiers, representative of the eight allied nations, marched through the Forbidden City as a token of China's humiliation. Li Hung Chang was recalled to office and with Prince Chang commissioned to treat with the Powers, only one of whom, the United States, seemed to have a definite policy. During the "peace" negotiations, the German army kept up a series of attacks and massacres of Chinese called "punitive expeditions" which in general character were a disgrace to civilization. An indemnity equal to $330,000,000 was imposed on the Chinese government in expiation of the Boxer outrages, and for her self-defense in the war following the attack on the Taku forts. Various safeguards for the legations were arranged and agreed to, the importation of arms and ammunition prohibited, and the Tsung-li-Yamen was transformed into the Ministry of Foreign Affairs which was to take precedence of the other ministries. Except legation guards, the foreign troops were to be withdrawn in September 1901. The Imperial edict of February 1901 accepted the terms imposed. On 9 April 1902, the Manchurian convention between China and Russia received the imperial seal. The Russians were to evacuate Manchuria within eighteen months, but to retain control over the railroads.

It was after this Boxer uprising that what we have called the Russian and the American foreign policies and systems of diplomacy had by contrast their most signal illustration. As soon as order was restored and the preliminary diplomatic arrangements made, the United States recalled all its military force, except a small legation guard, asked no favors in return for what had been done, and not only emphasized her recognition of China as a sovereign Power, but set a commendable example to the other governments by dealing justly with the Chinese in the matter and method of payment of the indemnity, thus illustrating again the fixed American policy of helping rather than taking advantage of Asiatic nations. Russia, on the contrary, demanding the right to occupy Manchuria with her troops and to make Port Arthur the terminal of her Siberian railway, began thenceforth the military possession of Manchuria, the building of the city of Dalny (q.v.), and the making of Port Arthur (q.v.) both a city and an impregnable fortress, and initiated various other enterprises on a vast scale, costing hundreds of millions of roubles, all of which suggested a prospective ownership in fee simple, rather than temporary occupation, notwithstanding that she solemnly covenanted to evacuate on 8 Oct. 1903. The United States believing in the good faith of the Muscovite government and in accordance with her policy of recognizing China's sovereignty, appointed consuls for the three cities in Manchuria which by treaty agreement were to be thrown open to the trade of the United States. When the appointed time drew near, there was no indication of any purpose on the part of Russia to keep her agreement. As early as 28 July 1903 the Japanese government expressed to Russia its alarm at the Manchurian situation. When Russia formulated new demands at Peking and seemed to consolidate rather than relax her hold on Manchuria, showing also increased activity along the Korean frontier, doubts were raised in Tokio as to the limits of Russia's ambition. Through his minister in Tokio, Baron Komura and his envoy, Mr. Kurino in Saint Petersburg, the mikado notified the tsar through Count Lamsdorff that wishing to remove every cause of future misunderstanding he desired to enter "upon examination of the condition of affairs in the Extreme East, where their interests meet, with a view to a definition of their respective special interests in those regions." Negotiations were opened and after long delay on the part of Russia the tsar announced that while willing to respect the independence and territorial integrity of Korea, Russia declined to extend the same engagement to China and requested Japan to acknowledge Manchuria and its littoral as entirely outside her sphere of interest. The tsar furthermore requested the limitation of Japanese control in Korea, even proposing a mutual zone covering all Korean territory north of the 39th parallel. Other negotiations, followed by exasperating delays in Saint Petersburg, took place, Russia meanwhile heavily reinforcing both her army in Manchuria and her fleet in eastern seas, purchasing and transporting also large stores of ammunition and coal to Port Arthur. On 5 February, Japan telegraphed the termination of her negotiations, severing diplomatic relations with Russia and withdrawing her legation. Then followed hostilities, begun simultaneously, both parties claiming that the other had fired the first hostile shot. In the war that

followed, the Japanese surprised Europe with the rapidity and brilliancy of their victories on land and sea, China remaining neutral except to take precautions against the violation of her frontiers. At the request of the German emperor, the American secretary of state urged upon three of the nations most interested, the limitation of the area of hostilities, to which they promptly responded. From the side of the Japanese it must be remembered that they were smarting under the sense of long-continued Russian aggression in Saghalien and Kuriles, begun very early in the 19th century. In 1861 a Russian man-of-war proceeded to the island of Tsushima, on which the Russian flag was hoisted and a settlement was made (though not until Japanese blood had been shed in resistance), which would have constituted a title of ownership had not Great Britain interfered. The Russians were finally compelled through British intervention to abandon their claim and leave. By the usual plan of "joint occupation," which in the Ussuri province of the Chinese empire had ended in China's loss of a territory as large as France and its incorporation into the Russian empire, the Russians gained complete possession of Saghalien. After the restoration of the empire in 1868 it was foreseen by the Japanese statesmen that Russia would be their chief danger, for already signs of her movement in Korea were menacing. This fact was the strongest determining element in the creation in 1871, in place of the old clan contingents, of a powerful army and navy for national defense.

It is more than probable, as history has clearly shown in the past and as the racial constitutions intimate, that progress in Japan and China will proceed from varying levels and in different channels. In the island empire the centre of national life is in the one unchanging dynasty and national amelioration has issued from the government downward. Any sure advance for Japan in the future will be from the same source and in a similar direction. On the contrary among the Chinese people, to whom the existence of this or that dynasty makes no vital difference, reform will arise in and proceed through their social system and not from throne or court. In China real and permanent progress has been less through anything done in Peking than directly traceable to the work of men who rose from the people and who had been instructed by foreign diplomatists, teachers or missionaries. These men have trained the people through the schools, the press, the churches and the hospitals, reaching all parts of the empire by means of the printed word, book, tract, newspaper or by personal influence upon China's leading men, whether in or out of office. In Japan before Perry's advent there were hundreds of men already enlightened, keeping eye on European aggression in Asia, and moving for the unification and reform of the nation. The great motive supplying the force of their lives came from no foreigner but from their own inborn patriotism and self-sacrifice. Nevertheless, when fullest credit is given to the propulsive power of her Bushido, or the Knightly Code, it must be remembered that Japan, after her first contact with Europe, never was truly a hermit nation. For 200 years or more the Dutch at Nagasaki fertilized the Japanese mind, keeping open not only the door of outlook on and information from Europe, but nourishing the Japanese intellect with exact science, varied knowledge and the applications of Occidental methods especially in medicine and the mechanical arts. In 1853 it was strenuously charged by the Conservatives who wished the country kept shut that only the native "Dutch scholars" wanted the empire opened to commerce and western influences. In 1868 when the men rich in Dutch culture and the "Mikado-reverencers" gained possession of the imperial person in Kioto, they began to relay the foundations of the empire by seeking for knowledge in every part of the world. Teachers, advisers, engineers and experts of all sorts were imported by the hundreds, who during 35 years have literally taken off their coats and, by example and teaching, redecraft and handicraft have shown the Japanese how to do those very things which they are now doing so well. The configuration of the Japanese Islands has fitted them to profit to an extraordinary degree by the adoption of the forces of steam and electric communication at a time most needed, that is, immediately after the abolition of feudalism and in the transit to industrialism helping to unify them politically and consolidate them into a marvously compact nation. In China, railways will re-distribute into wholesome evenness of proportions of tableland and littoral the population now congested in the river valleys and alluvial plains, will develop and distribute the wealth of the mines, will abolish the almost periodical famines, and by adding healthy movement and contact of the inhabitants of distant provinces develop in the Chinese that patriotism (as distinct from race pride which is already so intense), the lack of which has been the cause of China's many woes, and will give that middle term of a large intelligent and practical body of men of affairs between the throne and the masses, so notable in Japan and which China so sadly needs. The progress in both Japan and China has necessarily been thus far mostly of the material, educational and economic sort, for neither the Chinese nor the Japanese take kindly to the abstract thought or science of the West. It is an exceptional thing to get a Japanese or Chinese to listen patiently to the presentation of even the outlines of a metaphysical or abstract argument or proposition. Hence, therefore, in its doctrinal form, Christianity has made but slight progress, and the chief experience noted by foreigners in the reception of an Occidental creed of any historic name by Chinese or Japanese has been its simplification. It seems quite certain that Christianity as known and practised by the countries of the Extreme Orient is to a very hopeful degree expressed in practical forms or in reform. Nor is it at all likely that in accepting what Jesus taught these peoples will ever receive or assimilate also that Greek philosophy, Roman tradition and doctrinal achievement, and the ethnic peculiarities which form so large a part of popular Christianity in America and Europe.

The chief role which the Japanese are to play in the future — with probably the development of reserves of power greater than the average Occidental suspects in them — will be as the teachers of the Chinese, who number one-fourth of the population of the world, by interpreting to the sons of Ham the civilization and systems of the West, themselves acting as

the middle term between Occident and Orient. The Japanese have learned how vain it is to trust in material progress alone. The old sanctions and motives being now corroded or dissolved, they are seeking new guarantees for decency and progress. In answer to the impotent fears of many Japanese that their national solidarity, centred in the throne and imperial line, existing from "ages eternal," will be imperiled, and the similar terror of the Chinese conservatives, lest the whole edifice of society and morals fall to ruins, history has but one reply. Inexorable fact and reasonable probability, shows that dogmatic theology, as a political engine, must certainly give way before the advance of education and science; while if anything is certain from the record of the past it is that the first secret of Occidental progress lies in the fact that Greece, Rome and the northern nations of Europe, early in their careers, dropped ancestor worship and put the moral responsibility of the individual in the fore, making mental initiative a duty and not a crime. The Chinese and Japanese must find other grounds and sanctions for national life and perpetuity than in ancestral worship and their traditional, communal civilization. Happily the events of the last few years in the Far East show steady progress in the direction which history assures us is the only right one. The real line of advance had been in the direction of an increasing sense of both personality and individuality.

Having in our survey of China given the Chinese and average Occidental view of the situation in 1916, we shall in this article present what may approximate the view of the Japanese and of the scientific student of international affairs.

The logic of events and the general movements of civilization, within the last 50 years and especially from about the year 1880, have not only forced China and Japan, once hermit nations, into a new alignment with the western Powers, but into unexpected relations with each other. Of old, Spain, Portugal, Holland, England and France were the countries most industrious at the task of seizing and occupying the land of "the heathen," when whole continents were confiscated as prizes, or given away in the name of God, but in our days Great Britain has led all others. The new dogma of imperialism dominating European Powers in the 20th century means first the exploitation of the weaker nations, through capitalism and then the use of the governments in support of these advance agents of civilization, leading sooner or later to trade wars, to military occupation and to annexation. Great Britain, having led the way and set the example, rules 22 per cent of the earth's surface and 25 per cent of its population. Russia, France and the United States have followed. These four countries are, with China and Brazil, the six greatest landowners of the world controlling 62 per cent of the earth's area. All of these, except China and Brazil, whose boundaries were long ago fixed, have in very recent times seized the possessions of other peoples to enlarge their domain. The white man, imagining himself the favorite of Heaven, has appropriated nearly all of Africa, much of Asia, both continental and insular, and Polynesia. Only the Monroe Doctrine has prevented European Powers from reappropriating much of republican America. It is this lust for land, pelf and power, shown by the white man, that has conditioned the modern history of the Far East.

In the reawakening of national consciousness in the three nations, China, Korea and Japan, the Central Empire suffered first, having her frontiers violated and her soil invaded, while indemnities, more or less extortionate, have been forced from her. This nibbling and dismembering process, begun with the loss, in 1841, of Hongkong to Great Britain, has continued to this day. From her old-time area, Upper Mongolia and much of Manchuria has become the possession of Russia; Annam or Cochin China of France; and Formosa of Japan. Korea, weak and helpless, desolated her borders in order to make her territory forbidding to the covetous. In Japan, far-seeing spirits, over a century ago, discerning her eastern trend on the continent and the descents of Russia southward on Japanese soil, sounded the alarm by voice and writings; but only to be imprisoned or hounded to death as alarmists and to have their books confiscated or destroyed by the Yedo authorities. Only at a late hour did the Shogun's government awake to reality and begin the defense of the north and, in 1860, the expulsion, with British aid, of the Russians from the islands of Tsushima, near which, in 1905, Admiral Togo destroyed the Muscovite's naval power in the Far East. While in her hermit isolation, tortoise-like Japan, governed from Yedo, sought to defend herself by closing her shell, reckoning all aliens alike. To the three peaceful missions, sent by Presidents Jackson, Polk and Fillmore, to the unofficial calls of Glyn and Cooper, and to the private enterprise of Mr. King, in 1839, she gave firm refusal, to all but Perry. He refused to be refused, and his visible power, firmness and tact won. As soon as the intellectual movement in critical scholarship and historical investigation and the study of Dutch, begun two centuries previously, ripened to the *coup d'état* in Kioto in January 1868, the new, centralized, Imperial government came into power and instantly made bold assertion of the national consciousness. This was done by at once signing treaties in the name of the mikado, raising the first real, national army ever known in Japan, building a modern navy, sweeping away feudalism and inaugurating a definite foreign policy. This latter was manifested by the abolition of the long existing dual sovereignty of the Riu Kiu archipelago (Loo Choo Islands) long tributary to both China and Japan, the assertion of ownership of these and other outlying islands (such as the Bonin and other groups), the protection of her citizens in foreign lands, the establishment of consulates and legations abroad, the sending of hundreds of students to America and Europe and the importation of an equal number of salaried expert teachers and advisers (yatoi) from the Occident, "to relay the foundations of the empire." In a word, the Japanese, confessing their defects and the folly of long isolation, faced the situation. Instead of playing off one nation against another, they determined to find out the secrets of power in each and to apply these to their own needs. When some Riu Kiuans had been wrecked on Formosa and killed by the native head-hunters, the govern-

ment in Tokio, in 1874 lived up to its duties by sending a force to Formosa to chastise the savages. When a Peruvian vessel entered Yokohama harbor, loaded with Chinese coolies kept against their will, Japan freed them and then communicated in friendly terms with China and Peru on the basis of international law. In her further dealings with Korea and China, she refused to negotiate except according to the laws of nations. China, thus stimulated and compelled by a rival deemed inferior, began to see the necessity of providing what she had never possessed before, a standing army and a navy.

Meanwhile the three Powers of Chinese Asia — almost the only ones that still preserved their sovereignty — forced into new and embarrassing relations by the military and political activities of the Occidentals in or near their borders, found themselves at odds with each other. The old dogmas of statecraft, that had ruled the world of Confucian ideas in eastern Asia, were being challenged and jostled. Especially was China's attitude of superiority and her claim to universal dominion and homage, so long tacitly or openly expressed to the neighbor and pupil nations around her, offensive to the mikado's empire, as being anarchistic and anomalous. A war party formed in Japan for the invasion of Korea, that had taunted her island neighbor with being a traitor to Oriental culture. Happily, instead of hostilities, the government in Tokio offered the olive branch and a treaty was made in 1876. This action was followed by the United States and by China, in 1882, by which little Korea, though having few of the necessary features of a modern state, was dragged out, in all her poverty and weakness, into costly and perilous international relations. Only for two or three decades did she attempt to keep up the forms, or farce, of a state in the modern world of interrelations, while still her people had the mind of hermits. How hard old ideas and mental habits die is seen in China's attempt to hold both Riu Kiu (over which a long controversy arose, which it was hoped would be settled by the suggestion of Gen. U. S. Grant of a joint high commission) and Korea as vassals, despite the fact of her own recognition of Korea as a sovereign state. In 1894, these differences of view clashed and rose to the climax of war. Then, not for the first time on the bloody field, but initially as to modern armaments with steam and electricity, the two powers met — China fractional and divided and Japan united. The result of war's arbitrament was to clear the ground for the future history of Asia by abolishing forever the effete dogmas of universal and of dual sovereignty.

Now Japan illustrated the axiom that precept whispers while example thunders. Not the professions of amity and benevolence but the policy and action of Europe bade Japan follow up her advantage by aggression. As the pupil of the Anglo-Saxon nations, Japan — her sons having already read and mastered English and American history — proceeded to follow their compelling example. Dwelling on a chain of volcanic islands, with little arable soil and a fast growing population, Japan, like insular Britain, must needs have a larger food area and room for industrial expansion. Imitating England even to flattery, she sought fresh territory in other lands on the near continent, demanding, as "indemnity," or the price of successful war, what had long been a thinly populated country very near the condition of waste land; which was, however, on the westward route to Europe and further toward those nations and parts of the world whose ideas she had adopted and with which she was joined in brotherhood, having turned her back on Chinese culture. England, by waging nearly 50 trade wars in almost within as many years, had shown her what to do by seizing coaling stations, islands and vast territories, from the size of India to those of the dimensions of coral reefs, thus expanding her possessions in every direction, so as to have a never ceasing drum beat and a midnight as well as a noonday sun, and one shinning on her possessions during 24 hours of each day. Even the history of the United States, thanks to American missionaries and teachers, was a familiar object lesson urging to action and embrace of opportunity. Once but a narrow strip between the Alleghenies and the Atlantic Ocean, though already possessed of more land than could be worked intensively, the American people had extended their domains beyond the Mississippi and the desert, and out from the Pacific, even possessing Alaska, Hawaii and the Philippines. The Americans taught and enforced the Monroe Doctrine. Why should not the Japanese have one also? Hers, too, seemed "manifest destiny." Hindered in 1905 by the combined force of Russia, Germany and France, that were angry at the idea of Japan becoming so apt a pupil and doing what they had done, even making the European nations her models, Japan yielded to their mandate. She accepted, in lieu of Manchuria, Formosa, with a money indemnity sufficient to buy the battleships that in due time should enable her to win back what she had lost. The experience, in 1900, of marching with the Russians to Peking, did not tend to raise respect for the Russian military. Unable to see that the Muscovites had any more right to Chinese territory than they had, the Japanese, after the failure of polite diplomacy, faced their rival, now become enemy, in arms in 1904-05. They won a foothold on the continent, with control of the routes to Europe and then proceeded to follow the example immediately before their eyes, of the United States in appropriating the Philippines. This they did by absorbing Korea. Still following out the principles of the Monroe Doctrine, they determined that eastern Asia should no longer be the seat of exploitation, colonization and conquest by European or other foreign powers. In 1915 Japan settled her old scores and eliminated Germany from China and the islands of the Pacific. Still carrying out her purpose, of cementing the friendship and consolidating the power of the nations under similar conditions of culture, she resolved to rouse China into a fuller national consciousness in order to prevent that "break up" so heartlessly planned by European powers. Japan's underlying idea was to change China from a mediæval to a modern power, make sure of a market and hinder China's further dismemberment by the nations that had already seized most of the lands and continents not their own. That the Japanese motive was ethically as well founded as that of the Europeans' policy toward Asiatics cannot, when studied in the light of

history, be denied. In carrying out her policy of 1915 toward China, Japan simply employed the methods taught her and the weapons which had already been used upon herself and upon China for a century or more and approved by most Christian governments. Drastic they were, but if we take facts, instead of fears and prejudices for our guide, we see that Japan sought no conquest of China's territory, but aimed rather to influence her colossal neighbor by means of education, employment of her experts, the right of control of the resources needed, and propagation of religion, with freedom of conscience and unhindered modern civilization — all of which methods other foreigners had repeatedly used before her. Terrible as these demands seemed and ruthless as were the methods, real or apparent, as set forth in the hysterical exaggerations of the journalists in Peking and writers in American magazines, they were no more than Christians had made — often at the point of the bayonet and at the mouth of cannon, when forcing tariffs, collecting indemnities, or laying extortionate mulcts on both Japan and China. So far as history has recorded, the United States is the only country in which the national conscience, as in the case of the Shimonoseki affair in 1865 and in that of the Boxer outbreak in 1900, revolted against injustice and demanded and made return or reparation to the wronged. In 1915 Japan resolved to forestall European aggression—which might yet have another recrudescence after the war, when Europe should awake from her international insanity.

What President Monroe's ultimatum in 1823 meant to the Holy Alliance and Fillmore's message through Webster to Austria in 1850, and Cleveland's word in 1895 to Great Britain in the Venezuela matter — all of them republishing the Monroe Doctrine — Japan's actions have meant to all conquering nations who talk about such monopolies as "the control of the Pacific," "British Supremacy," or "interests" of any sort, which are opposed to international law. Seeing that it was highly probable that, after the waste of the Great War, European nations would expect to do what Holland did with Java, Britain with India, and France with Africa — pay their national debts by grinding the faces of the Asiatics — Japan took opportunity by the forelock. Her motives in the China affair of 1916 were at least as honorable and even as altruistic — so far as intelligent self-interest would allow — as were the motives of the European powers that once seized America, Africa, Asia and Polynesia. The actual result, for the benefit of mankind, was to awaken China from her almost soulless slumber and to give her a new soul, uniting the nation as never before and replacing race pride with patriotism.

That this idea of defense against the land-hungry nations of Europe was not a new or even recent one, born of the ambitions of an upstart people who had borrowed modern artillery and diplomacy, is clear to all familiar with that notable body of historical literature, produced in Japan since the Russian descents on Saghalien, in 1807. How thoroughly the Japanese fear of European conquest — with the example of subjugated India and Java and the humbled China of 1860 before them is seen in the answer given to Dr. J. M. Ferris in New York, in 1866, when questioning the first two students arriving from Japan, as to what brought them so far, even to America. "We came to learn how to make big cannon, so that we shall not be conquered" was their instant and ingenuous reply.

In contrasting the relative action and prolonged policy of Japan and China, in their first meeting with the nations of the West, we note a startling difference. Building another Great Wall of conceit, trusting to her traditions and choosing intrigue as her chief weapon of defense, by playing off one selfish power or sordid interest against another, China made, during the decades of her humiliation, no serious effort, as did Japan, to win and hold a place of honor among the nations, by interior reformation and appropriate outward respect. Never, until late in the 19th century, did China make decent recognition of either foreign governments or international law, ignoring even the existence of her people abroad, and so ultimately had to yield in impotent fear to all threats. On the other hand, Japan acknowledged the age-long folly of her isolation, broke the crust of inherited conceit, confessed her defects, sought for alien talent and industry over all the world according to the mikado's oath of 1868, abolished feudalism, recreated her industries and kept most scrupulously all her engagements, whether of treaties, "gentlemen's agreements" or Open Door arrangements, as those who deal with facts not fears agree. Had China awakened, 70 years ago, from sloth, ease and age-crusted conceit, as she did awake after 7 May 1915, there would have been, for neither Japan or China, any Anglo-Japanese Alliance, or Russo-Japanese War, and no German-Japanese War. It has been the supreme purpose of Japan to have China realize these truths. The very fact that the Japanese have felt the wounds and retain the scars at which others jest, explains her terrible sincerity in teaching China the lesson of 7 May 1915. That China should employ Japanese political, financial and military advisers (Japan having already employed and benefited by over 5,000 of them, chosen from at least 20 nations) is in no way strange. Of the 3,938 foreign employees in China there were, in 1914, 1,105 British, 1,003 French, 533 German, 463 Russian, 174 Americans and others, but only 245 Japanese. As for partial control of China's armed forces, why should not China profit from the Japanese, as well as from Occidentals, to gain what she has never had — uniformity and the best results — in place of the waste, inefficiency and the confusion arising from the variety of arms and ammunition, including infantry rifles of 10 or a dozen calibres? As for the right to propagate religion, only the decadent and bigoted nations still in mediæval darkness would think of opposing the proposition. Japan, since she opened her ports, and especially since 1873, has far surpassed some European nations in freedom of conscience. The hostile critics of Japan, who argue from forebodings rather than realities, seem to forget the history of European, British or American aggressions from Monroe to McKinley, or else they imagine that one code of morals rules the West and another the East.

One may perhaps sum up the newspaper reports, magazine articles and those recent books

which are journalism but not literature, exaggerating the diplomatic demands of Japan and giving a sinister interpretation to all her acts and motives, in the proverb, "a guilty conscience needs no accuser," since the only new element in the case of 1915 was that it was Japan, and not an Occidental power, that by provocation roused China to new life. It is reasonably certain that those who fatten on Chinese love of conservatism and who "land" big contracts, or enrich themselves or debauch the Chinese with opium, liquor and drugs, want to keep things as they are and misrepresent Japan, whose first purpose is to change things for the better. So far from China having been nationally "awakened" before 7 May 1915, the mass of her people are still like those Americans who, while their feet are wet with the slush of Inauguration Day, want the date changed, but forget all about the matter when their feet are dried. Yuan Shi Kai is reported to have said in 1916, "As soon as the trouble is over, we indulge in all kinds of pleasure forgetting all the former humiliations." Notwithstanding all that has been said, China's territorial integrity has not been disturbed by Japan, even though other powers have not only threatened but have also seriously injured and even mutilated it.

If China — that is, the 400,000,000 of her people — has really "awakened" this time, then the shame of the Chinese may change the destiny of the Far East. With the self-reformation that has come from the Japanese goad, this unwieldy mass of humanity has shaken off much that in this 20th century world is a hindrance to growth in true nationality. A new spirit of independence and patriotism has entered into the Chinese, so that it does not severely tax our credence to suppose that 7 May will hereafter be celebrated like our own 4 July, as Independence Day, in a holiday truly national and from which point in time the nation, oldest in the world, started on a new career of universal education and of industrial, commercial and political prosperity.

To the thoughtful student of humanity's progress, or one who has freed his mind, even in part, from ethnic, racial, credal and commercial prejudice, it would seem that the chapters of history opened in the Far East since Washington's time, who commissioned Major Grey as the first American agent in eastern Asia, are of the highest interest and happiest augury. It seems to be demonstrated that the general American policy that has left on Asia the mark of the school, college, church, hospital, missionary healer, honorable merchant and truthful and just diplomatist is not only the best in morals, but reveals the one method, as yet unexcelled, for the promotion of commerce, mutual prosperity and the peace of the world. The Monroe Doctrine, as established in 1823 and enforced by James Monroe, Millard Fillmore, Abraham Lincoln and John Hay, can be in accord with justice and righteousness, only as it is applied not only to America but to the whole world. It means that nations have the right, each to its own soul and soil and to live in such peace as they are able to maintain. "If America support Japan's contention and Japan America's, Europe will be forced to acquiesce, and peace in the Pacific will be secured" is the general verdict of the latest and ablest writers on this theme.

WILLIAM ELLIOT GRIFFIS,
Author of 'The Mikado's Empire,' 'America in the East,' 'China's Story,' 'The Japanese Nation in Evolution,' etc.

CHINA DECORATION. The decoration of china, and, indeed, of all kinds of clay wares, falls into two groups: (1) Controlled by method, and (2) controlled by producer. The former group deals with the fact that a decoration can be introduced at any stage of the manufacture; the latter concerns itself with the various handicrafts employed.

Decorations may be used under the glaze, either on the unburned or burned clay; in the glaze, as a natural coloring; on the glaze, after the hard-glaze fire.

Decorations on the clay usually take the form of *sgraffito* (incising); inlaying, or *pâte-sur-pâte;* or painting with diluted clay. In the two latter it is important that the inlaid or overlaid clay should be similar in composition to the main body, or the fire will cause them to separate. The body piece, formed either in a mold or upon the wheel (see POTTERY MANUFACTURE), is kept quite damp, and the design, lightly sketched in India ink, is carefully followed. In inlaid work a channel is tooled out of the body, and filled in with clay of a different color. In *pâte-sur-pâte* no cutting out is necessary, but usually the background is stained a dark color and the design is laid on in white. The beautiful works of M. Solon are of this class.

On the burned ware under-glaze decoration may be either painted or printed. Most of the modern hotel and restaurant ware is printed under the glaze.

For some classes of work a coloring added to the glaze itself is very effective. By this means are produced the flowing and flashed effects much followed by the Japanese and by many French ceramists. In America the Dedham Pottery has worked in this direction.

For work over the glaze a lower fire is employed, many more colors are available, and the processes of decoration include painting, gilding, printing, and ground-laying.

Ceramic colors are made from certain metallic oxides with which are blended a fusible flux, so that the mixture may melt and attach itself to the glaze. Various fluxes are in use. They are composed of red lead, borax and quartz sand in varying proportions. These ingredients are melted together, and the resulting glass is finely ground. For blues the oxide of cobalt is used; for greens, those of copper and chromium; for yellows, antimony and lead; for reds and browns, iron; for dark brown, manganese; and for grays, nickel and iridium. Gold produces rose color and purple, and a pink is also made from tin oxide and chromic acid. In some cases the colorant and the flux are melted together; sometimes they are united only in the grinding-mill. For under-glaze work, as well as for the coloring of clays and glazes, the list is not so full. Some of the oxides fail under the higher temperature, and must therefore be confined to over-glaze use.

In the second group, decoration is considered as a handicraft. Division of labor is the rule in a manufactory, and thus a piece of china may pass successively through the hands of the

ground-layer, the painter, the printer and the gilder, together with those of many minor operators. To the ground-layer falls the task of distributing an even tint over the whole piece or upon some part of the design. Using a stiff oil, — linseed boiled with litharge or lead acetate,— he dilutes it with turpentine, and brushes a thin coating over the china. This coating he dabs with a soft linen pad, and then spreads the color, a fine dry powder. A certain quantity adheres to the oil, and a smooth tint is the result. If only part of a design is to be covered, the free portions are painted with a water-color mixed with molasses. The work is oiled and dusted as before, and is then immersed in water, when the water-color is washed up, taking with it any of the ground color which may have settled upon it.

The painting of china scarcely needs a description. The colors are as already explained, and the painting depends upon the personal skill put forth. The colors are mixed in turpentine and fat oil just as the painter pleases, for each artist mixes his own palette. The colors change somewhat in the fire, but not as much as is often supposed. The main difference is a great gain of brilliance.

The gilder is mainly employed to embellish the work of others. He uses pure gold, as pure as it can be purchased. This is received in the form known as "coffee gold," a brown granular mass. Mercury is added of about the same weight as the gold and the whole is ground perfectly fine. When mixed with the proper oil this can be used freely as a paint and the oil and mercury are driven off in the fire. Gold thus prepared needs to be burnished after firing; but there is another form of gold, known as bright or liquid gold, which is much cheaper, and therefore largely used on common wares. In this case the gold is dissolved and the solution is mixed with certain oils. The fire removes everything but the metal, which is left as a brilliant film on the china.

Printing from copper plates has been in use ever since 1756, but for many years has taken an inferior position. At first it was employed for fine engravings and decorative subjects, but lately only for borders and outlines. The pattern is engraved upon a plate of planished copper, and the printer makes this plate quite hot upon his stove. The color, mixed in a very stiff oil, is also kept hot, and with this the engraving is charged. An impression is taken upon thin paper, and this print is handed to a woman who cuts away the superfluous paper and presses the print on to the china. A bath of cold water removes the paper, and the color, rendered hard by the low temperature, remains firmly fixed. The fire completes the process.

Lithographic printing is now very popular in china decoration. The process was introduced from France some years ago, and the prints were made abroad; but recently the more successful manufacturers have established their own lithographic departments. The prints are made in the usual way from stone, except that no color is applied to the stone itself. The impression is taken in varnish, and the color is dusted on the printed paper. On account of the transfer the order of impression is reversed, the print which is first on the paper becoming uppermost when the impression is transferred to the china. The paper used is double, consisting of a sheet of tissue paper cemented on to a stiff backing. The stiffness is necessary to withstand the pressure of the machine, and when printed the tissue is stripped from the sheet and proves flexible enough to accommodate itself to the surface of the ware. The printing is done in vitrifiable colors, of course, and the finished china is fired in the usual way.

CHINA, Great Wall of, the White Wall, the Wall of 10,000 Li, the largest artificial defense structure on the face of the earth, a barrier extending for about 1,500 miles in the north of China proper, of which it partly forms the boundary. Its western end is in the deserts of central Asia, its eastern reaches the sea to the northeast of Peking, and it has an extension to the Sungari River to the northeast. It was erected as a barrier against the inroads of the barbarous tribes, and part of it dates from about 214 B.C. The greater part, however, was constructed during the latter half of the 14th century. It is carried over height and hollow, and avoids no inequality of the ground, reaching in one place the height of over 5,000 feet above the level of the sea. Earth, gravel, brick and stone were used in its construction, and in some places it is much more substantial than in others. Its greatest height, including the parapet on its top, is about 50 feet, and it is strengthened by towers at regular distances. The average height of the wall is about 22 feet and the width 20 feet. The towers are about 40 feet high. Consult Geil, 'The Great Wall of China' (London 1909).

CHINA INK, or INDIAN INK, a black solid substance, which, when rubbed down with water, forms a very pure black indelible ink. It has been used in China from time immemorial, and both there and in Japan is employed for writing, small brushes being the implements made use of. In Europe it is used by draftsmen, artists, etc. It is manufactured in various ways and from various materials, but consists essentially of fine lampblack incorporated with a gluey substance, the whole being dried and consolidated into cakes and sticks. Some kinds are made with animal or ivory black, others with lampblack got from camphor or oil of sesame. There is generally added some perfume—a little musk or camphor. Many attempts have been made to imitate Chinese ink, some of which have been tolerably successful. Almost all the imitations consist of carbon ground up with gum, gelatine or fish-glue, but the quality and tint may vary according to the special carbon employed and the process of manufacture. Good Chinese ink should have a velvety black appearance, with a gloss which becomes very conspicuous on rubbing. The color it gives on paper should be pure black and homogeneous, and if water be passed over it it should not run or become streaky. See INK.

CHINA INLAND MISSION founded 1865 by the Rev. J. Hudson Taylor, has had a remarkable history, and many denominational societies have learned from it valuable lessons in faith, economy and the pre-eminence of spiritual methods. It has been carried on without the backing of any distinct constituency and without direct appeals for financial aid. The Reverend Taylor first went to China in 1853, in connection with the Chinese Evangelization

Society. From Shanghai he made numerous inland journeys and four years later resigned from the Evangelization Society and began independent work in Chekiany province. After a visit to England in 1865 there followed, as the result of a remarkable spiritual experience at Brighton, the formation of the China Inland Mission, and on 26 May 1866 Mr. Taylor returned to Shanghai with a party of 15 missionaries. The work was organized under a directorate, the districts mapped out and the 11 great inland provinces, whose 250,000,000 people had never heard the Gospel of Christ, were opened up. Believing in medical work, the mission now maintains 9 hospitals, 68 dispensaries, 27 physicians and a great number of trained nurses. Over 35,000 persons are now in fellowship with the churches, and over 50,000 have been baptized since the commencement of the work. The annual income raised ranges from $200,000 to $291,000.

CHINA ROOT, the root or rhizome of *Smilax china,* a climbing shrubby plant closely allied to sarsaparilla, for which it is sometimes used. *Vitis sicyoides,* a species of vine, is known by this name in Jamaica. It is a native of Eastern India, Japan and China. In the United States the roots of smilax have been used as substitutes of China roots, and similar smilax roots have been used in Latin America.

CHINA ROSE, the name given to a number of varieties of garden rose chiefly derived from *Rosa indica* and *R. semperflorens,* both natives of China. The name is also given to *Hibiscus rosa-sinensis,* one of the mallow tribe, common in China and the East Indies, and an ornament in greenhouses.

CHINA SEA, that part of the North Pacific Ocean bounded on the north by Formosa, on the northwest by China, on the west by Anam and the Malay Peninsula, on the southeast by Borneo, and on the east by the Philippines. It contains numerous islands, receives several considerable rivers, and forms the important gulfs of Siam and Tongking. The currents in this sea are very mutable, depending much upon local circumstances.

CHINA-TREE, Wild, a common name for the soapberry-tree (*Sapindus marginatus*). It is a handsome tree, sometimes growing as high as 60 feet. The flowers are white and the oval berries are very saponaceous. It grows from Florida westward to Arizona and northern Mexico, and in southern Kansas. The wood is very hard, and heavy, weighing nearly 60 pounds to the cubic foot. It is also a name given to a native tree of India, *Melia Azedarach,* the pride-of-India. It is extensively cultivated in warm countries as a shade tree.

CHINA WAX. See WAX.

CHINANDEGA, chē-nän-dā'gä, Nicaragua, a town, capital of the department of the same name, 26 miles northwest of Leon, and 10 miles from the port of Corinto on the Pacific, with which and with Managua it is connected by rail. It is a place of considerable trade. Pop. about 15,000. In 1849 an agreement was formed in Chinandega to confederate the Central American republics into a political unity under the name of Central American States; but this scheme fell through.

CHINAWARE, the name given to porcelain made in the Chinese empire and imported as "Chinaware," now chiefly confined to the soft porcelain made in England, of which bone-ash is the characteristic ingredient. This class of ware is called "bone china" by the potters and dealers of America. Bone-ash was used at Bow and at Chelsea, near London, as early as 1750 and has been extensively employed ever since. Bone china consists of kaolin, pigmatite, or Cornwall stone, and bone-ash. The clay and rock are found in Cornwall, England; the bone is largely imported from America and the Argentine. The proportions in a dry mix are about as follows: Kaolin, 40; stone, 20; bone-ash, 40. The heat at which the kilns are burned ranges from 2,300° to 2,400° F. Bone china is not made to any great extent in America, though some few manufacturers have put it forth as a side line. The particular merits of this ware lie in its snowy whiteness, and in the soft glaze which makes it possible to produce very beautiful decorations over the glaze. For rich services this class of china is unrivaled. See PORCELAIN.

CHINCH, the popular name of certain fetid American insects of the family *Lygæidæ,* genus *Rhyparochromus,* resembling the bed-bug, very destructive to wheat, maize, etc., in the Southern and Western States. The name is also applied to the common bed-bug (*Cimex lectularius*).

CHINCHA, chēn'chä, **ISLANDS,** a group of small islands off the coast of Peru; lat. 13° 38' S.; long. 76° 28' W. They are granitic, arid and destitute of vegetation, and the coasts bold and difficult of access. Immense deposits of guano used to exist here, but after being exported for 34 years the supply became exhausted in 1874.

CHINCHAYCOCHA, chēn-chī-kō'chä, a lake of Peru, in the department of Junin, 13,330 feet above the level of the sea, 36 miles long and 7 broad, with an area of about 300 square miles. It is the source of the river Jauga, and abounds in fish and wild fowl.

CHINCHILLA, chin-chil'la, or **ERIOMYS,** a genus of South American herbivorous rodents allied to the cavies, which they resemble in the general shape of the body, in the limbs being longer behind than before, in the conformation of the rootless molars, and by the nature of the fur, which is more woolly than silky. *C. lănigĕra* is about 15 inches long from the muzzle to the tip of the tail, and is covered with a beautiful pearly-gray fur, which is highly esteemed as stuff for muffs, pelisses, linings, etc. The chinchilla lives gregariously in the mountains of western and southern South America, principally in Peru, Chile, Bolivia and Argentina, and makes numerous and very deep burrows. It is gentle and sportive, loses none of its gaiety in captivity and is very cleanly. This genus gives its name to the family *Chinchillidæ,* which contains two other genera, one (*Lagidium*), including a large chinchilla-like rodent of the Andes; and the other (*Lagostomus*), containing that large numerous burrower of the pampas called vizcacha. The chinchilla derives its name from the Spanish *Chinche,* bed-bug, on account of a certain odor which it gives off. This derivation must not be confounded with that of the town Chin-

chilla. The latter name is a corruption of the Roman Saltici (Saltigi) on the site of which Chincilla stands. Ruins of the old city still exist in the neighborhood.

CHINCHILLA DE MONTE-ARAGÓN, chĭn-chēl'yā, Spain, city in Murcia, in the province of Albacete, 10 miles southeast of the city of that name; situated on a rocky eminence. It is surrounded by a wall and commanded by a castle. Its handsome parish church has three naves, and a lofty tower containing six bells; the interior is richly decorated and contains pictures and other works of art. Quarries of granite, alabaster, gypsum and limestone are wrought in the vicinity. It has manufactures of cloth, linen, leather, earthenware and glass, and a trade in the agricultural produce of the district. Pop. 6,795.

CHINCHOLLE, shăn-shōl, **Charles Henri Hippolyte,** ĭp-pō-lēt, French journalist and novelist: b. Chauny, France, 16 July 1845; d. Paris, 21 Aug. 1902. In the earlier portion of his career he was secretary to the elder Dumas, with whom he occasionally collaborated, and from 1872 was a member of the staff of *Figaro,* where he gained a reputation on matters of passing interest. He was an extremely versatile writer, but his style is wanting in finish. Beside his one-act farce, 'Oncle Margotin,' which ran 300 nights in 1870, and 'Le Mari de Jeanne' (a drama in three acts) and other plays, his romances and other works include 'La Plume au Vent' (1865); 'Alexandre Dumas Aujourdhui' (1867); 'Les Pensées de tout le Monde' (1868); 'Dans l'Ombre' (1871); 'Le Lendemain de l'Amour' (1880); 'Le Catalogue de l'Amour' (1881); 'Paula, Histoire d'une Neurosée' (1888); 'La Ceinture de Clotilde' (1884); 'Les Survivants de la Commune' (1884); 'Les Jours d'absinthe' (1885); 'Le Vieux Général' (1886); 'Femmes et Pois' (1886); 'La Grande Prêtress' (1887); 'Biographe du Général Boulanger' (1889).

CHINCHON, chĕn-chōn', Spain, a town 25 miles southeast of Madrid. Peruvian bark was named "chinchona," now habitually misspelled "cinchona," after a Countess of Chinchon, wife of the governor of Peru in 1638.

CHINDE, Africa, a town on the only navigable mouth of the Zambezi. Here the inland steamers meet the ocean steamers of various European companies; and here, too, Great Britain has obtained from Portugal a small piece of land called the "British Concession," for commercial purposes, and a residential district called the "Extra Concession." It is the entrepôt for Nyasaland and northeastern Rhodesia.

CHINDWARA, chĭnd-wā'rā, India, a district in the central province of Nerbudda, situated on the southern slopes of the Salpura Mountains. Its area is 3,915 square miles. Large forests cover the greater portion of the country and a great supply of coal has recently been found there. In the upper part of the district over 2,000 feet above sea-level the climate is very mild, and it sometimes is cool enough to form ice. The annual rainfall averages about 36 inches. Pop. 517,000, of whom more than one-half are Hindus.

CHINESE ARROWROOT. See NELUMBIUM.

CHINESE ARCHITECTURE AND ART. The fine arts in China are as varied in character and as rich and tasteful in design as those of the peoples most successful in art; but they are known to Europeans in a very unequal fashion. Thus the architecture of the vast country, contained in the old provinces of China, as large as the United States west of the 100th parallel, and as diversified in soil and climate, is so little known that the essays on the art written even by former residents in China deal obviously with certain very limited places only — the neighborhood of a certain city, the borders of a certain river and the like — and are, moreover, the studies of men not conversant with the construction or with the decorative buildings of any part of the world. The history of this architecture is yet to be written. The photographs now obtainable, having been made during the years since 1890, open up a new world of architectural art. It is enough to say here that there exist two systems of building; the one being a framed construction, usually of wood and capable of great elaboration, the other a solid masonry construction carried out in brick or stone according to the resources of the neighborhood and the cost of the building. The framed system of building is closely akin to that used in Japan; and it is there that we can best study the wooden temple-tower and the wood-framed hall of reception. As for the masonry buildings, they are often large and massive, as is well known to all who have observed the walls and gateways of the great fortified cities and the famous "Great Wall" which protected Pekin and its neighborhood from northern invasion. In the way of more decorative buildings less is known of the system of design, but several peculiarities may be mentioned. Thus there is a marked preference for the octagonal form in towers, and everywhere throughout the central provinces these buildings, called by the Europeans pagodas, rise above the hills and show over the groups of houses. The often cited use of the polygonal arch, that is, one with the intrados at least many-sided instead of curved, is to be noted as indicating how much that is attractive we have still to discover. The decorative gate-ways (pailoo) corresponding nearly to the *torii* of Japan and to those edifices called *toran* in the peninsula of India, are often admirable designs in the way of purely decorative architecture, monumental architecture having no direct utility. The dwellings of the Chinese, even the palaces of the princes, do not seem to include many-storied and ponderous structures, but cover immense tracts of ground with gardens, among which stand buildings of no great height, but of a singular beauty of construction, especially in the roofs, and very richly decorated within. The dwelling-houses of the people are generally walled with brick and are not striking in their external appearance. The roof is an especial feature in Chinese art. It is commonly built with a hollow upward curve, the result of a very interesting system of construction, with light wood-work. This slightly concave surface covered with glazed ridge-and-furrow tiles richly colored is an important feature in Chinese architectural composition. Painting in strong pure colors is a recognized element of external design; and it has been truly said that the special and dis-

tinguishing feature of Chinese exteriors is gaiety. Even the slightly-built one-story shops of the great towns are bright with vermillion and green; and the signs, painted with the very ornamental Chinese ideographs, help in this effect.

Chinese painting reached a great development as early as the 8th century A.D.; and there is every probability that it had then been a great school for several centuries. Landscape was one of its especially favored branches. While in Europe no one dreamed of landscape art for its own sake, the Chinese impressionist designers were producing admirable studies, both in color and in monochrome. Some few of these are in European museums, their authors and dates having been fixed by careful comparison, but the much more modern Japanese landscapes, in painting, monochrome and woodcut, are the best material from which to gain a general idea of that ancient landscape art. A highly religious art was developed in the 12th century A.D. At that time Buddhist religious feeling was strongly expressed in the art of some painters, while others affected rather a kind of decorative realism, that is to say, a close observation of natural objects used to inspire and to influence a highly decorative system of design. These paintings have been little known to Europe, because they are preserved in temples and almost inaccessible palaces; and again it is Japan which has opened to us, through her own art, a knowledge of the older arts of China. A few ancient paintings known to Europeans are of surprising interest; and they open up to us a whole system of design in form and color on the flat surface, which the West is now studying, much to its own advantage. The paintings best known to us are of some purely decorative character, those on porcelain having attracted the attention of Europe ever since the 16th century. These paintings are closely connected with the system of inlay which in the form of cloisonné enamel (see ENAMEL) is another of the great art industries of China. The porcelains affect a more close and careful study of the natural forms in flowers, trees, costume of figures and the like, whereas the enamels are more severe and are confined more closely to the making of admirable patterns; but the two systems differ only as one and the same artist might change his style according to the material and demands upon him. A similar method of decoration by the free use of natural forms, conventionalized but still retaining much of their character, is seen in the splendid embroideries which have been little known to the West until within a few years. The textile fabrics of China — silks, brocades and velvets — have been known to collectors for many years, but very few national museums have provided themselves with any number of them: they present an inexhaustible treasure of beautiful design in strong and positive colors. It may be stated here that brilliant color is a specialty of the Chinese artist. Where, as in a fine cloisonné enamel, a Japanese artist works in dark and sombre colors, the Chinese will use a sky-blue ground, upon which an elaborate pattern is carried out in deep ultra-marine blue, violet, reddish-gray, dark green, apple green, vermillion, bright yellow and white, with dividing lines of gilded metal, and many passages of gradation from one color to another. No people have equaled the Chinese in the decorative use of bright, pure colors.

Sculpture in the sense of a grand and permanent art of form is less the business of the Asiatic artist than painting, or than decoration properly so-called. Sculpture in the form of carving in ivory and wood and bronze figures of small size has always attracted great attention in China and has reached an extraordinary state of excellence in spirit, movement and skilful composition. Thus, a bronze figure will express perfectly the character and the sentiment of the occasion, while yet losing nothing of its sculpturesque value; and a group of "The Seven Wise Men" seated around the trunk of a bamboo will be rendered in cheap glazed pottery or in minutely carved ivory with equal skill and at a price proportionate to the labor expenses and the prime cost of the material. The ivory group may have cost, when new, a hundred times as much as the piece molded in clay, fired and then glazed and painted, but it is not on that account a finer design, the characters are not more perfectly expressed nor the attitudes of the figures more forcible or more harmonious with each other. This is a great evidence of an old traditional skill of sculpture excelling in the larger as well as in the smaller scale of work. Relief sculptures, especially those in wood, in soft stone and in the surface of lacquer, which has generally a wooden background prepared to receive the impressed and sculptured coat of the viscous material, are as effective for their decorative purpose as are the sculptures in the round. Finally there must be mentioned the lapidary's art, in which the Chinese have always excelled, for the most marvelous carvings in agate, jade and rock crystal, that is to say, in the hardest materials known, are unmatched in the world, and they are as artistically perfect as the carvings in the softer stones; their essential characteristics perfectly understood and always observed. The conventional way of rendering in hard material the most delicate leafage and sprays of twig and blossom is perfectly maintained; and the brilliant polish which is one of the beauties of these carvings is carried through beneath those delicate undercut sprays.

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1. Enameled copper plate. **2.** Porcelain Vase (Siwen-te, 1426-1436). **3.** Painted Screen. **4.** Porcelain vase (Ming, 1368-1644). **5.** Snuff-jar of green paste. **6.** The War-God. Kwan-ti, in porcelain. **7.** Tea-pot of terra-cotta. **8.** Embroidered altar-cloth. **9.** Silk embroidery. **10.** Hair-pin.

book: Notes on Some Chinese Painters' (New York 1906); Münsterberg, 'Chinesische Kunstgeschichte' (2 vols., Esslingen 1912); Sei-ichi Taki, 'Three Essays on Oriental Painting' (London 1911); Stein, 'Ruins of Desert Cathay' (ib. 1912).

RUSSELL STURGIS,
Author of 'Dictionary of Architecture.'

CHINESE CERAMICS. Until a little over a generation ago the foreigner in China found it both difficult and dangerous to personally investigate the inside conditions prevailing in that country's ceramic industry. The technique and history of China's wares, therefore, remained a mystery to Westerners, and written evidence was largely erroneous if not supposititious. The pottery and porcelain pieces themselves, in museums and private collections of Europe and America, were the main source from which to gather information. Père d'Entrecolles (a Jesuit priest) sent some letters home (1712–22) containing remarks concerning some technical processes used in preparing the different clays, glazes and colors. Julien's translation (published 1856) of the Chinese work entitled 'Ching-tê Chên t'ao lu' was scholarly, but, failing to have expert knowledge of the technique of ceramics, he misinterpreted terms and led future writers astray. Franks (1876) aided much with his classification and intelligent system; Dr. S. W. Bushell's 'Oriental Ceramic Art' (1899) revolutionized the field of knowledge on the subject. Cosmo Monkhouse's 'History and Description of Chinese Porcelain' (1901) assisted the work. Then came a translation of the 16th century 'Album of Hsiang Yüan-p'ien.' The result of the life residence of Captain Brinkley contained in his voluminous work 'China' (1906) afforded further insight into the facts. But, greatest factor of all in deciphering the mysteries of Chinese ceramics was the founding of the Chinese republic. Access to the many sources of reliable information have lately become comparatively easy; internecine warfare induced many wealthy natives to part with treasures which in times of peace none could purchase. The opening up of railroads has laid bare large numbers of buried pieces of fictile art through excavation of graves centuries old. With our present knowledge we can not only decipher the characteristics and history of wares back to the Sung Dynasty (960–1280), so long hoped for, but we have an insight and productions of the T'ang Dynasty (618–906) wares in undreamed of splendor.

The following meanings of several Chinese terms used in ceramic lore will aid to a better understanding of the subject: The body or *paste* of Chinese porcelain (hard paste), termed *tz'u*, is composed of *kaolin*, a native weathered pegmatite (silicate of alumina), which is very refractory, and *petuntse* (*or pe-tun tz'u*), a fusible, finely comminuted clay, derived from the same felspathic rock as the *kaolin*. Both are products of decomposed granite. The glaze (termed *yu*) which covers the porcelain body is also composed of *petuntse*, but all Chinese glazes contain some proportion of lime to increase the fusibility of the *petuntse;* it is the lime which gives the tinge of green or blue characteristic of Chinese porcelain, besides conducing to the brilliancy of the glaze. The Chinese term for earthenware, as differentiated from the fused porcelain and stoneware body, is *wa*. The finished product of the kiln is known as *yao* (similar to our term *ware*). Thus *Kuan yao* is "Imperial ware" (*Kuan* meaning Imperial), and *Sung Kuan yao* is the Imperial ware of the Sung Dynasty. *Ting yao* is the ware produced by the kilns at *Ting-chou*, or wares of the *Ting* type.

Early Chinese Pottery.— The earliest pieces of Chinese fictile ware come to our knowledge are an imperfectly baked earthenware with a green or thin yellow glaze (sometimes unglazed). They belong to the Han Dynasty (206 B.C.–220 A.D.). By the time of the T'ang (618–906 A.D.) the potter's and all other arts were flourishing, and most beautiful forms had come into being. In Shosoin, the noted storehouse at Nara (Japan), are hard pottery vessels with beautiful blue, yellow and green glazed ornament on a bare body, others have green and orange glaze. They belonged to the Japanese Emperor Shomu, whose belongings were stored there on his death (749 A.D.). These pieces have enabled connoisseurs to identify confidently such pieces in their possession as examples of the T'ang Dynasty and, therefore, made before the middle of the 9th century A.D., yet perfect as to form, potting and glaze. Life-size figures and statuettes in this early pottery also are extant, beautifully sculptured. Berthold Laufer's researches into examples taken from tombs of the Han period (206 B.C.-220 A.D.) in this century show an earthenware usually having green glaze. Recent excavations on the Pien-Loh Railway have, practically, crowded the Peking market with pieces, probably dating back as far as the Han period — *Han wa*. Altogether we are now fairly assured of the following facts.

Ching-tê Chên pottery kilns became famous early in the 7th century, under the name of *Ch'ang-nan*, with the Imperial Court patronage; the ware was termed "Ceramic Jade" (*T'ao Yu*). But, during the Wei Dynasty (220–265) the *Tung-ou* kilns produced refined ware. In the T'ang Dynasty (618–906) *Shou yao* (yellowish ware) was made in Anhui province; *Yueh yao* (greenish ware), *Shu yao* (white ware of Sau-chuan), *Pi-se yao*, or "secret color" ware (for Imperial use only), belong to these T'ang pieces. The process of "marbling" was also used in *T'ang yao*. But the finest ware prior to the Sung Dynasty was the noted *Ch'ai yao*, made middle of the 10th century. It was "sky color, mirror clear, paper thin, resonant, glossy," etc. T'ang ware was of "plaster-like" body and ran from faience to stoneware, even to true porcelain. Soft lead glazes were used colored with metallic oxides to green, purplish brown, blue, amber. Some ware has felspathic glazes in white, brownish green, chocolate brown, purplish black, "tea-dust" green; some have "frothy" patches, same as Sung ware, in gray or bluish gray. Ornament is mostly incised with a point, or stamped or carved low relief. Colored glaze fills in the cavities.

Sung Dynasty Wares (960-1280).— This period is called the Golden Age by the Chinese. Court patronage brought successful potters into the artist class. Sung wares were as follows: *Ting yao*, made at Ting-chou (in the North) first, then moved to Ch'ang-nan (South), the present Ching-tê Chên. *Yu yao*, made at Yu-chou; *Kuan yao*, made at K'ai-fêng Fu; *Lung-*

ch'uan yao, Chün yao, Chien yao. There were also a number of minor kilns. *Ting yao* was a "semi-porcelain" and has been called "father of our white porcelain." It was covered with a glaze thicker and less transparent than later porcelains, and its soft appearance has caused it to be erroneously termed by Westerners "soft" porcelain. Dillon calls it "kaolinic stoneware." Forms, at first, were copied from bronze vessels. Product was: Plates, saucers, wide-mouthed bowls, etc., Often, being baked inverted, foot is glazed but rim bare. Rarely crackled. Some pieces plain, others have molded relief peonies, phœnix, day lilies, scroll-work, "key" pattern, etc. The Yüan Dynasty, following the Sung, contained the same wares, evolving little new. Forms of these dynasties are bold. Some pieces show ornament painted in red, blue and green enamels, but carving, molding and incised work are most frequent, depending on beautiful opalescent felspathic glazes. In a study of these early Chinese wares it must be borne in mind that the main inspiration of the potter was to make from clay the closest possible imitation of jade — the most precious stone of the Celestial. Hence we get these glazes of opalescent ("tallow-fat") depths of faint greenish yellows, yellowish blues, etc.; they are the *celadons.* They are the ultima Thule of present-day collectors.

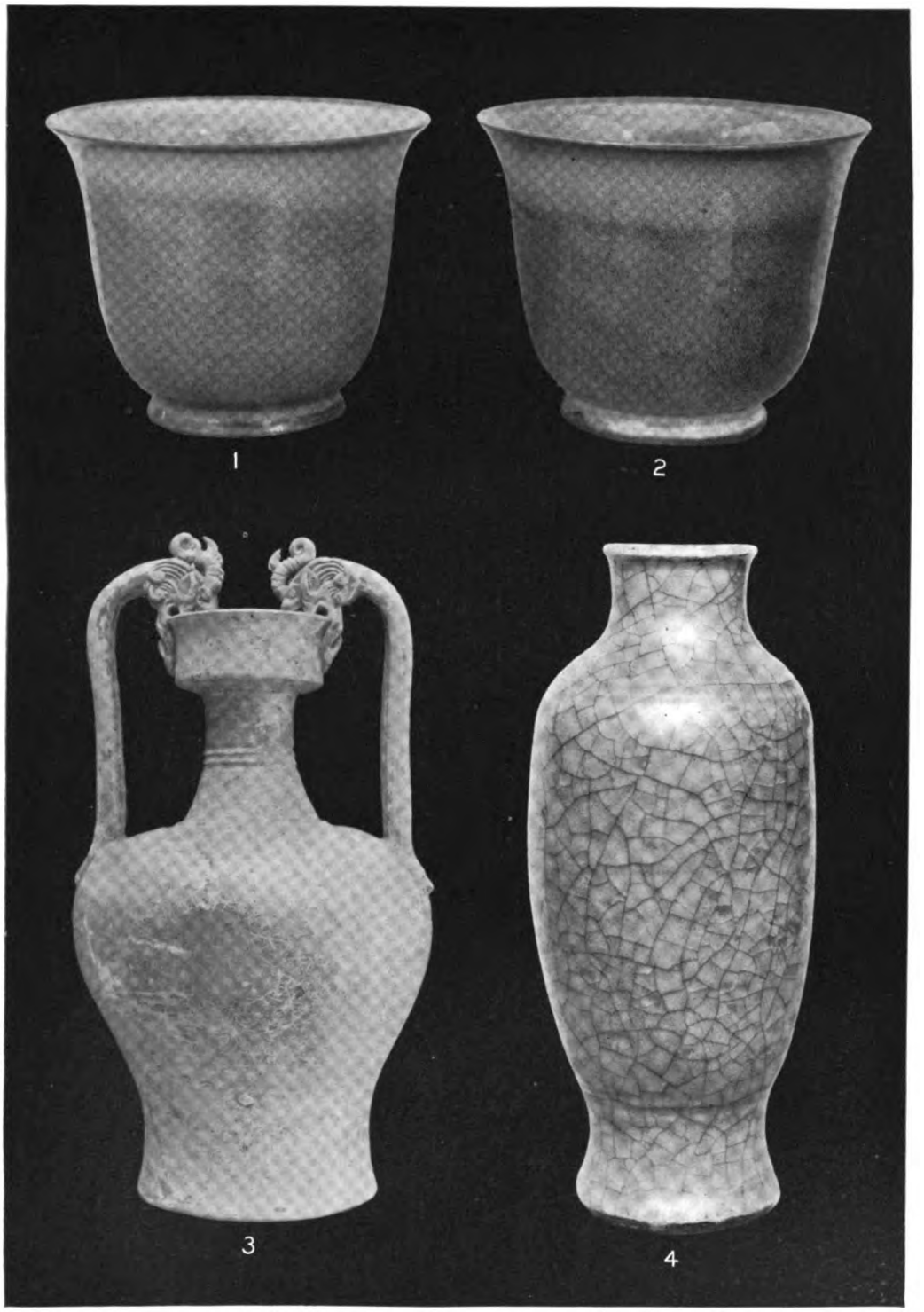
Chinese Porcelain Period.— In discussing Chinese porcelain we must always have the clear understanding that there are three oven heats entering into the "firing." First there is the *grand-feu* (1,350° Centigrade) heat needed to create a vitrification of kaolin and petuntse, producing the porcelain body and glaze, and fusing the underglaze colors. Next comes the *demi-grand feu* obtained by placing pieces in those parts of the oven which have the least heat. Lastly there is the *muffle oven heat* (from 830° to over 1,000°) which fuses the enamel colors to the surface of the already baked ware.

Ming Dynasty (1368-1644).— Kaolinic (felspathic) wares had been made (7th century) long prior to actual porcelain. These, usually opaque, are at times slightly translucent and resonant, but are classed as stoneware. A true porcelain, of mediocre quality, was made by the 10th century (Sung Dynasty), and blue-under-glaze decorated pieces were produced in the 14th century (Yüan Dynasty). But it is to the Ming Dynasty we must look for the first real supplies of true porcelain. The Ching-tê Chêng kilns had become now so numerous and important as to leave all others forgotten. These potters favored blue-and-white and polychrome decoration. The "classic" types fall into the 15th century. From Yung Lo's reign (1403–24) we get white bowls extremely thin and translucent; the decoration is incised or traced with fine slip (liquid paste). The finer examples extant are the noted so-called "egg-shell," the *t'o t'ai* ("bodiless") of the Chinese connoisseur. The decoration is unnoticeable unless held up to the light, and it is almost paper thin. Few of the many similar pieces extant can date so far back. In the Hsüan Tê period (1426–35) we find the *Hsien hung* ("bright red" or "rouge vif") transmutation glaze. Few examples of this exist, even in China. It is similar to the later *Lang yao,* the Western collector's *sang de bœuf.* The *Pao-shi-hung* ("precious stone red"), is also transmutation glaze and likewise derived from silicate of copper. The next important period is the reign of Wan Li (1573–1619). More specimens of this period are extant than probably any other of the Ming reigns; mostly blue-and-white. The wonderful "Mohammedan" blue of former periods was no longer procurable and we notice the blue has acquired a purplish tinge. Extant are some boxes for holding cakes, sweetmeats, etc.; they are oblong, square, round and have mostly dragon designs in dark blue. Shipments are now being made abroad and pieces show frequently hurried workmanship of export ware already. The body is white and termed "unctuous"; glaze is lustrous but bluish. The kilns of Yi-hsing were turning out a reddish yellow or brown earthenware; it is the ware known in Europe at that time as "boccaro," and has relief decoration, like other wares of this period. Relief and pierced work in combination are found. Large polychrome jars show raised outline designs, carved and filled in with *demi-grand feu* glazes (turquoise, violet, purple, yellow, green). Flat wash decoration appears in *san ts'ai* (three-color)— green, yellow, aubergine. Red underglaze in various tones is used now. Enamel overglaze decoration is done largely; a characteristic of this reign being enamel decoration in combination with underglaze blue. Marked monochrome Wan Li pieces are rare. The last three emperors of the Ming Dynasty are not mentioned in Chinese ceramic works, and what wares we know of are inferior; of coarse body, crude design, impure colors. China had serious internal troubles and potters were not patronized by the wealthy.

Ming glazes were thick and usually applied before baking. Foot rims are plain, without grooves or beading as later on K'ang Hsi wares. Body is close grained, white and fine texture; the edge of the foot is bare of glaze and the baking has given it a brown color. Ming vases have thick, massive body; forms favor "double gourd," square body and gourd-shaped neck, bottles of globular body and tapering neck, melon-shaped pots with lobed sides, ovoid jars. Other pieces are barrel-shaped garden seats, porcelain plaques for furniture inlays, screens. Dishes have saucer-shape usually.

The noted *Fukien* or *Tê-hua* white porcelain ware was made at Tê-hua Hsien. It is the *blanc de Chine* of the collector. Body is clear white, very translucent, and has satin-like glaze of a cream or ivory whiteness. Many of the old examples exist, including statues of Kuan-yin (goddess of Mercy), Kuan-yu (god of War); Bodhidharma (Apostle of the Buddhists), Manjusri (Buddhist Trinity), etc. Some pieces have nothing but their plain charm of delicate body and glaze to show; others have incised designs; others again have high relief decoration, such as plum, dragons, phœnixes. The latter variety are the least valuable. This ware was made till late into the 18th century and is recently being again reproduced.

Ch'ing Dynasty (1644-1912).— Little of interest occurred until the reign of K'ang Hsi (1662–1722). This is the greatest period in Chinese ceramics; it is also the most prolific. Three-fourths of the Western collections belong to this period. The wonderful Lang yao ware was produced at this time. The red is the



1 and 2 Flower Pots. Chün Ware
3 Tomb Vase. T'ang Period (618-906)
4 Celadon Vase (crackled), Ming Dynasty (1368–1644)

sang de bœuf so greatly prized by Western collectors. Derived from copper oxide, the secret of production of this marvelous brilliant red glaze has been lost. In spite of the wonderful control these potters had over the oven's heat, no two pieces of this ware are alike. The green tinged glaze is most desired by native connoisseurs. Other noted glaze colors were: *Shê p'i lü* (snake-skin green), *shan yu huang* (eel yellow), *chi ts'ui* (turquoise), *huang pan tien* (spotted yellow). Their monochrome yellow (*chiao*), brown or purple (*tzu*), green, soufflé red (*ch'ui*), and soufflé blue were beautiful. Most honored, generally, by the Western world were the blue-and-whites. The *Kai-pien-yao* or so-called *soft* paste blue decorated ware has been called a "masterpiece." Another marvel of art and technique is the hard-paste porcelain "egg-shell" ware, thin as paper, nearly as translucid as glass and of wax-like body. Another greatly admired blue-and-white is the "hawthorn pattern" (plum blossom), the *Mei-hwa-yao*. The blue is perfect in lustre, depth and purity. The Dutch and the West India companies carried immense quantities to Europe, mostly a second "export" made-to-order quality of considerable beauty, but the highest class pieces are also found. It was the time of specialization, when one man painted trees only, another animals alone, another ruins, and speed was demanded of the "export" qualities. The pictorial designs used were innumerable, from court scenes to mythological subjects and flowers. The "hawthorn pattern" was favored for "ginger jar" shapes. Reserve panels were used for romantic scenes and domestic figure subjects, etc. All this blue-and-white is underglaze (cobalt) blue.

China's *steatite* (soapstone) porcelain has great repute in this period. It is the so-called "soft" porcelain of Western collectors. The substitution of soapstone for kaolin produced a wonderfully light body with a "vellum" surface just adapted for the delicate, miniature-like, brush work paintings done on this ware. Some K'ang Hsi polychromes consist of underglaze blue, red and clay slips and glazes (such as "Nanking" yellow, baked in the *grand-feu* in one process. An underglaze red, from copper oxide, was revived from early wares, and assumes irregular effects in the firing: maroon, *sang de bœuf*, even "peach-bloom" variegations. An underglaze red style of painting was done now. Another style of polychrome decoration was done in washes of different glaze colors. The "three-color group" (underglaze transparent green, yellow and aubergine) was continued from the Ming style. This same *san t'sai* (three-color) combination was also done in muffle (enamel) colors.

Certain similarity in color combinations of Chinese wares led the French connoisseur, Jacquemart, last century to group them into "families"; thus we get the *famille noire, famille verte* and *famille rose* wares. The first is done by overlaying a dull black pigment with transparent green enamel washes, producing a greenish black. The lead of the green flux creates some iridescence on the surface. In this ware we have statues of Buddhist and Taoist deities, demigods, sages and Chinese native figures. In the *famille verte* group we have combinations of underglaze blue with the onglaze *san t'sai* (three-color) and the coral red (iron oxide). The tracing of the design in brown black, all covered with green, forms one type of this "family." In another an overglaze blue takes the place of the underglaze. *Famille verte* is costly and highly prized — even those pieces which are second rate. The motifs are traced in with red or brown black outline and the spaces filled in with washes. The beautiful apple green used is a characteristic of K'ang Hsi pieces. Sometimes the red and blue are absent. Touches of gilt occur.

K'ang Hsi monochromes are numerous. We find the pale yellow ("husked chestnut") on white glaze. The American's "peach bloom," the Chinese *pin-kwo-ts'ing*, is a pale red becoming pink in some parts, mottled in others, with russet spots displayed on a background of céladon tint. It is a *grand-feu* transmutation effect in underglaze, and is a "sport" or freak demonstration. Blue monochromes are innumerable in this period, such as the "bleu soufflé," applied by insufflation; most noted, however, is the "mazarine" (dark) blue; the turquoise or "kingfisher" blue (*fei ts'ui*) is another. The green monochromes about equal the blues in number: "Apple," "leaf," "cucumber" (*Kua p'i lü*) greens are famous.

Yung Chêng Period (1723-35).— The product of this reign is highly refined. In it we find the well-known "armorial china," certain sets of ware decorated with the coat of arms of the European and American owners. They have caused much trouble and discussion among collectors through the writer Chaffers erroneously attributing the ware to the English town of Lowestoft. Even to this day, after full proof of its being of Chinese manufacture it is often termed "Sino-Lowestoft." Snuff bottles of this and the next reign are scarcely equaled and are highly prized. The paste of this reign is whiter, less blue than former periods. Underglaze red (*yu li hung*) painting is much used, some combined with the underglaze blue. Greatest of monochromes now is the wonderful *famille rose* ware, in "egg-shell" saucers, dishes, plates, coffee and tea services of lovely finish. The "rouge red" and "ju-jube red" (derived from gold) and pinks are admired the world over and pieces are costly. The delicate color is imposed on the back of the ware, and imparts an incomparable effect with the white upper surface of these "rose backs" and "ruby backs."

Chien Lung Period (1736-95).— Monochromes follow former periods, including blue-and-white (often running to archaic bronze forms). To this reign belong lavenders, *clair de lunes* (céladon), violets, soufflé and plain blues and a deep lapis lazuli. The common blue has a poor dull indigo tinge. The potters of this time showed their wonderfully expert powers in "reticulated" and other open work on perfume boxes, lanterns, insect cages, spill vases, etc. "Rice grain" (*grains de riz*) pattern was done on the body by small perforations filled in with transparent glaze. By covering the surface with black lacquer and inlaying patterns with mother-of-pearl the potters produced their *lac burgauté* ware. The powerful European influence exerted during the last two reigns created a bastard ware of degraded European design in Chinese paste. The later porcelains are not of art interest. A peculiar ware is that known as "clobber." It is decorated porcelain

ware made in China on which the Western painter has "improved" the underglaze designs with overglaze decoration and some gilding.

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CLEMENT W. COUMBE.

CHINESE EMPIRE. See CHINA.

CHINESE-FIRE, a pyrotechnic composition, consisting of gunpowder, 16; nitre, 8; charcoal, 3; sulphur, 3; cast-iron borings (small), 10.

CHINESE GLUE, a superior glue and varnish, obtained from a species of *Alga* which abounds on the shores of China. When once dried it resists the action of water, and is used by the Chinese to fill up the lozenge-shaped interstices in the network of bamboos, of which their windows are frequently constructed, as well as to strengthen and varnish the paper of their lanterns.

CHINESE GORDON. See GORDON, CHARLES GEORGE.

CHINESE GRASS, CHINA GRASS, RHEA or **RAMIE FIBRE.** See RAMIE.

CHINESE HEMP. See CORCHORUS.

CHINESE IMMIGRATION. Until the California gold discoveries of 1848 there were literally no Chinese laborers in the United States. From 1840 to 1850, according to the records of immigration, only 35 came over, and those all in the year from June 1849 to June 1850. During the next decade 41,397 Chinese came to the port of San Francisco, of whom about 6,500 returned to China, leaving the net Chinese population in 1860 34,933, nearly all in California. For some years the general feeling continued to be favorable, as labor was dear and domestic service almost impossible to obtain; and the Chinese laborer, and above all, the Chinese house servant, seemed to make industrial progress and lives of refined leisure possible. In 1858 the Reed Treaty was negotiated, and no restriction was placed on immigration. In 1862 the California legislature appointed an investigating committee on the subject; but it was still felt to be only a local nuisance, not calling for any hasty or severe measures. Even as late as 1868 the Burlingame Treaty with China, though reprobating enforced immigration (coolies under contract), asserted the right of migration to be inherent in the human race; and on 27 July 1868 a special resolution of Congress, in response to anti-immigration measures in the East, repeated this assertion as to the right of human beings to expatriate themselves, and declared that its restriction was contrary to the fundamental principles of the republic. This meant European immigration; but it proves that even then the Chinese question had not become acute enough locally to force California politicians into making it a national issue. Within a few years after this, however, it was not only the burning issue of the Pacific Slope, but had emerged into the national arena. Those who saw the excessive strain placed on democratic institutions by ignorant European immigrants, ultimately assimilable, were appalled at the prospect of operating them among a huge unassimilable and purchasable brute-vote on the Pacific Slope. If they were made voters, they would force a permanent political division on the lines of race; and if not, would form a dangerous anomaly and nuisance in the republic. Thus, white industry, order, sanitation, public morals and statesman-like forecast united in the conviction that this class of immigration must be prohibited or severely restrained. These valid objections and fears were reinforced by others, unsound or exaggerated. The numbers arriving were vastly swollen in popular imagination, and the departures suppressed. The actual number of Chinese in the United States in 1870 was 62,376, an increase of some 27,000 in 10 years; 69,298 had come over within 10 years, and 34,850, or over one-half, had gone back.

After attempts at restriction by local legislation, which were invalidated by the Federal courts as in violation of United States treaties, California appealed to Congress for a national law; but that body evaded the question till 1876. Then the exigencies of the Hayes-Tilden campaign compelled both parties to bid for California's electoral vote by anti-Chinese planks in their platforms; and Congress (the House, 6 July, the Senate 17 July) appointed a joint special committee to investigate the subject. It met at San Francisco 18 October, heard a mass of testimony and made a very voluminous report, taking the strongest ground in favor of a restrictive law (Senate report 689, 44th Congress, second session, 27 Feb. 1877). At this time the Chinese population was about 100,000. Nevertheless, the party pledges were not redeemed in Congress till 1879, when on 20 March such a bill was passed; but it was vetoed by President Hayes as being in conflict with the Burlingame Treaty. In 1880 a commission was sent to Peking to negotiate a new treaty permitting the restriction. This treaty, signed 17 Nov. 1880, ratified by the Senate in March 1881, gave the United States the power to "regulate, limit, or suspend" the immigration of new Chinese laborers, but not to prohibit it altogether; permitted laborers already in the country to remain and travel to and from it at will; and allowed Chinese merchants, students, teachers or travelers to exercise their functions without

molestation, each class to have all the privileges and advantages of the most favored nation. (The Chinese population here in 1880 was 105,465). Under guise of giving effect to this treaty, Congress, in March 1882, passed an act suspending Chinese immigration altogether for 20 years. This was vetoed by President Arthur on the ground that so long a suspension was virtually absolute prohibition, and not in accord with the spirit of the treaty. On 6 May another bill was passed to meet this objection, suspending fresh immigration for 10 years, both of skilled and unskilled laborers, permitting those already here to remain, but forbidding their naturalization. The provisions of this act were minutely severe. The exempted Chinese must have certificates of identity issued by the Chinese government, and the only Chinese laborers who could be permitted to return after once departing were those who had a living wife, parent or child in the United States, or $1,000 worth of property, which was made answerable for their default.

This was "amended" on 1 Oct. 1888 by the Scott Act, striking out all permission to return for any purpose, forbidding the issue of return certificates and declaring all that were issued void,— in a word, absolutely barring America to any Chinese workman once outside it. A treaty was at this time pending between the United States and China by which the Chinese government was to prohibit the emigration of laborers and the United States was to protect those in the country from violence, which it had shamefully failed to do, but the Scott Act enraged the former government, and it refused to ratify the treaty. On the expiration of the 1882 act in 1892, the "Geary law" of 5 May extended it for another 10 years, with further severities, not called for by any dangers at hand. On 7 Dec. 1894 a convention with China restored the conditions of return to the status of 1882. On 3 March 1901 it was enacted that a Chinaman can only be arrested under these acts on sworn complaint of certain specified United States officers. In 1902 the exclusion was re-enacted for another decade. With the general intent of these acts there is little difficulty in concurring; but some of the provisions, and the petty acridity of their execution, exhibit a spirit of panic which is neither dignified nor sensible. The volume of the immigration is the very essence of the danger; if it is insignificant it is harmless. The Chinese population in 1890 was 107,488; in 1900, 89,863; and 71,531 in 1910. In 1915 the District Court of Montana (223 Fed. Rep. 801) and the Circuit Court of Appeals of New York rendered decisions which in effect assure to Chinese students in the United States (in accordance with existing treaty rights) continuance of privileges accorded the subjects of the most favored nations.

CHINESE LACQUERWORK. See LACQUERS AND LACQUERWORK.

CHINESE LANGUAGE, The. Among the oldest of human scripts, the Chinese system of writing has had an astonishing effect upon the life and structure of the language itself. It has conditioned largely the development of both the native speech and the written form of the vernacular, making the acquisition of Chinese one of the most easy, and yet the most difficult, in the linguistic field. There is, apart from syntax, virtually no grammar. From one point of view Chinese is the unaltered baby-talk of mankind, fixed, too early in its history, by writing. This, while allowing for endless development in forms visible to the eye, has robbed the soil and closed the avenues of growth to what meets the ear. The whole language, spoken and written, consists of rudimentary monosyllables, each intended to represent a word or thing. It is true that these are often combined to make compound words. Various other devices have been elaborated, which enlarge the powers of conception and expression, while expanding the field of description. These verbal combinations, and especially the compound written forms, appeal powerfully to the mind through the eye. The striking characteristic in the Chinese and Turanian languages is the unchangeability of the root, the reverse of the case in Semitic and Aryan languages. The meaning of a word is determined, not by giving it a name as a "part of speech," nor by inflection, or terminology; but wholly by its place in the sentence. The same character may serve in manifold forms as noun, verb, adjective, adverb or other part of speech. To the native, or expert scholar, this is not so difficult, for the notable device of using auxiliary words is constant and universal. There are hundreds of these words, which, having long served as more or less correct conceptions of things, according to their shape, size, use, nature or relation, act as so many ready-made agents of classification. The categories which they suggest or furnish enable the Chinese to extend the powers of both thought and language, and on perception of a new idea or object, at once to catalogue or classify the novelty, whether native or foreign, when first presented to the mind. Where we say 50 "head" of cattle, a "flock" of sheep, a "brace" of partridges, or a "span" of horses, a few tens of times, the Chinese employ these aids to memory and classification in hundreds of instances. It seems clear that, as concerning the luxuriance of the written characters and the comparative poverty of the sounds of the spoken vernacular, nature's law of compensation has been strikingly illustrated. Not a few sounds in vogue in ancient times — as for example, those in the classic poems and old rhyming dictionaries show — have been lost; while of the written characters or logograms, at least 25,000 words are still in use, and the Great Dictionary of Kang Hi in the 18th century contains 44,449. It is quite possible, counting obsolete words and remembering the great demands made by the modern age, that 80,000 characters may be legitimately considered as in the Chinese repertoire. Since the recent revolutions and the establishment of a republic, Chinese editors, writers and government departments have found in the word-coinages and character-combinations of the Japanese a rich addition to the resources of both speaker and penman in China. Beginning as early as 1870, the literary men of Japan, who used the script of China, and not a few of whom were at home in the Chinese classics, began, from the storehouse of the past, to mint new expressions for Occidental and modern ideas and things. These, after trial and long use, have been accepted in China. Thus a rich infusion of terms has come to reinforce the oldest of languages, with the newest of needed additions in a mighty nation, suddenly brought

face to face with a new world of thought. In neither case has any modification of the syntax or structure of the two languages been sought or wrought. There are many written forms, or styles, of writing, six at least of these being long and widely recognized. While this shows the copiousness of the language, as it issues from the pen, it does but reveal also the poverty of vocables in the native speech. There is no common language of the lips in the Chinese republic, nor is there the verbal unity, such as exists even in Russia. A linguistic map of China would suggest a crazy quilt, lacking all unity. The "mandarin dialect," so-called, comes nearest to being a standard spoken language, and possibly offers a ground plan, on which the hoped-for future linguistic unity of the Chinese republic may become a possibility. This speech of educated men, especially of officials and those who travel, has even been under literary cultivation and is an excellent medium of thought. Hardest of all for foreigners is the mastery of the "tones." By means of the device of uttering the same sound in various vocal forms, depending chiefly on pitch, the same word or sentence is made to bear widely different meanings and to effect varied purposes. Yet this is one of the devices tending to pauperize the spoken language, even while eking out the popular resources of sound, and to expand the written language. With a stick on the sand or earth, or with pencil or paper, educated natives of various lands, under the Chinese world of culture, can converse all day; even when the opening of their lips means instant confusion, the eye, in this case, having supreme advantage over the ear. The writer has often been amused, while among his Oriental friends, at the discussions consequent upon his interrogations put to them. Controversy might run high owing to the paucity of sounds and the very large number of homophones (from five to a thousand, or more, characters, to express one sound). When no pen, pencil, blackboard and chalk, stick and earth were at hand, understanding and final settlement were reached by using the forefinger of one hand as the chalk, and the palm of the other as the blackboard, so to speak, in order to give something like graphic visibility to the argument or answer. One can quickly tell what a spoken word means, when he sees the characters with which it is written, but otherwise has more or less difficulty. Some amusing blunders in foreign books, especially those of tourists, have arisen from lack of knowledge of the ideograph. To reduce the mass of written words into categories of thought, the ancient tables of 514 radicals, or root-ideas, have been grouped under 214 heads. Knowing these — and every mature pupil is expected to have them by heart — a bright learner quickly discerns in a new character the basic idea. Then, according to his education, culture, imagination and experience, he can recognize a meaning new or old, or dissect a sentence. Such knowledge serves very much, as with us, as a classical education does helping one to dissect new or unfamiliar words. Undoubtedly, in its origins, the Chinese language was hieroglyphic, each character being meant for a picture of the object represented — as in the still recognizable forms for moon, sun, field, etc. Ages ago, however, all such vestiges passed from sight. The invention of the hair pencil, in place of the stiff stylus, and the necessity of holding the pen and paper in the manner now common, revolutionized the old form of script. The "grass character" or running hand, completed the separation of idea and form. There is thus no alphabet in China, though in modern days 26 or more characters have been selected and are used arbitrarily for their phonetic value only and chiefly to transliterate foreign names. In modern days, also, some progress has been made, chiefly by missionaries, in Romanizing the colloquial in various provinces. Among prominent educators, chiefly American, plans are under way for a reform of the diversified scripts of China, Korea and Japan. While all three have a common basis of inheritance and culture, yet they differ in their written forms. The three ways of expressing thought, in writing, are thus found in adjoining countries,— the ideograph, or logogram (China); the syllable (Japan); and the true phonetic sign, or alphabet (Korea). There seems no insurmountable obstacle — while leaving the vernaculars of the three countries untouched — toward the creation of one standard system of writing, as in most of Europe, for all the lands which value the Chinese inheritance.

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WILLIAM ELLIOT GRIFFIS,
Author of 'China's Story in Myth, Legend, etc.'

CHINESE LANTERN, a lantern made of thin paper, usually variously colored and much used in illuminations.

CHINESE LITERATURE. In this article we propose to sketch the history and treat of the influence of the literature of China in molding not only the thought and character of the Chinese people, but also those of the neighbor and vassal nations included in the circle of Chinese culture, rather than to catalogue the books or to comment upon them. Only the great landmarks in the literary field of the centuries, and what in the present are rooted in antiquity and are true outgrowths of the same, will come under our view. The mental attitude of the Chinese author is ever upon the past, as the sure dwelling-place of perfected ideals. The typical man of China looks not upon "the judgment of posterity," but hopes ever for the approval of the ancients. "How can I face my ancestors"? is his question. Hence the two great systems of philosophy, the first founded upon the authority of the fathers of Chinese order, and the second upon that in which knowledge is discoverable by intuition, and resting upon reason and science. The first has had vastly greater vogue in China proper, the second in Japan. A history of the literature of China to date still awaits the pen of a native author, but the Chinese classify their literary production under four heads: (1) The Classics of Confucius and

Mencius, with the general cultural apparatus of education, such as commentaries, dictionaries and works that treat of language, and its contents, as the vehicles of thought; (2) history, including biography; (3) ethics and philosophy; (4) poetry. Other literary matter, such as fiction, romance, drama, modern newspapers, works of science and books of information are hardly recognized as literature, in the true sense of the term, or as worthy of notice by the literary critic as such. The characteristics of Chinese literature are terseness and absence of anything like obscenity or low forms of language; while in poetry the general themes relate to the sadness of things, as shown in the abounding sorrows of life, the brevity of human existence and the beauty of nature. There is little personification, nor is there much that is infused with the idea of the personality of Deity, or the individuality of man. The Unseen Power is rather conceived of as Abstract Right, or a bundle of laws and forces; while toward man the outlook is that of brotherhood and mutual duties. The whole literature is instinct with the spirit of freedom and the necessity of the individual's obedience to the laws of the great impersonality and the folly of disobeying or flying in the face of heaven's decrees. China's history has repeatedly verified the thesis that so long as her deathless literature animates her people, despotism cannot permanently exist. The literature of China is the key to her history. Her social system is based on her literary inheritances, and has remained intact during the 25 centuries of her recorded history, during which time over 30 dynasties have risen, ruled and been overthrown. When the scholars of China and Japan first heard of American democracy and the revolt from the tyranny of Great Britain, then ruled by a German king, they ascribed their thought and action to the knowledge which the "barbarians" had, in some way, gained from the writings of Mencius! By the native orators, in 1911, who preached and agitated for a republic, justification was sought and impassioned appeals were made to the writings of this famous commentator, Mencius, who expounded the writings of the sage and gave to the text of Confucius that political significance which they have never lost. So vast and powerful in its influence is this classic literature, that it has had the threefold effect of furnishing the norm and philosophy of government, besides serving as the basis of training for office, through a series of competitive examinations over 1,000 years old and only recently in form abolished. This exaggerated veneration and devotion to the ancient classics have checked the development of intellect, of thought and literary expression; putting all originality more or less under ban, while acting as an invincible force in creating models of style. A modern essay, state paper or argument is effective, in so far as it is a mosaic of quotations, references or allusions to the classics, or to the ancient or mediæval standard literature; nor is any written language or colloquial speech richer in literary memorabilia, than that of China. So widely disseminated is this feeling of veneration and appreciation, that any missionary, or other alien, can always gather a crowd, upon the streets, in a Chinese city by quoting from the classics and asking attention to their exposition. Hence, therefore, the two great streams of thought, or rather the river and the rill; the one, which is wholly Confucian and based on authority of the ancients; the other, that which is intuitional, or based on science; though each is like the other in literary method and form. Both history and literature were shaped and unfolded in the feudal period, when China was a state of small area. The legendary and semi-historical ages had passed and a relatively high state of civilization had been reached. Letters and writing, songs and annals, wise maxims and a considerable mass of products of the pen were already in existence, when Confucius was born (551 B.C.). His work was almost wholly that of an editor. He invented or taught nothing new, but rather made the teachings handed down from the ancients the norm of his own thought and expression, while setting in order the rich inheritances of the past. From the first utterances of the Chinese soul, which were in poetry, he selected, from over 3,000 odes, rhymed and in four-word lines, 311 pieces, testing their merits also with the lute. Poetry has ever been the delight and occupation of Chinese literary men, though in later ages when the pronunciation changed, the rhyming assonance has suffered, and in many of the odes the primitive sound-forms cannot be recovered. The seven-word stanza, with the "surprise line" in the last verse, has also been in use. Modern collections abound, but the standard thesaurus, issued in 1707, is in 900 chapters or books, containing 48,900 pieces. The eras of the Tang (618-905) and Sung (960–1278) dynasties were especially rich in poetry. Some attempts have been made in recent times, but so far without striking success, to frame poetical thought on Occidental models. Love of nature, the spirit of fraternity and sympathy with humanity mark the Chinese poet. In his lines there is little about romantic love, but much in praise of wine, and of the glories and beauties of the external world; yet with frequent touches of tender sentiment and with bursts of sublime admiration and awe, in view of creation's wonders. Briefly stated, the five classics, or *king*, of Confucius, and the basis of every Chinese gentleman's education, are: (1) History; (2) the Book of Changes; (3) The Odes; (4) Rites and (5) His own Annals. History begins with the canon, which Confucius found to his hand and he added, as his own work, the annals of spring and autumn. The result of his labors, however, has been that the sage shines more brilliantly as a moralist than a historian; and, except for the style, the annals are not highly valued. Indeed, it cannot be said that history, in its modern sense, existed, until there arose the father of Chinese history, Szu Ma Chien, who was born 145 B.C. He compiled and reduced into books containing nearly half a million characters, the story of the nation's life; though neither he, nor his predecessors, attempt to explain the origin of the Chinese people. It is only fabulists, or myth makers, later than Confucius, who attempt to bridge the gulf of ignorance on this point. Often edited and reissued, the standard edition of Szu Ma Chien's work was published in 1747. Outstanding, among all other historical works of a later date, is the colossal 'Mirror of History' of Szu Ma Kwang (1019–86). China's most orig-

inal thinker, Lao Tsze, taught a philosophy resembling in its main features that of India, though without leaving behind him authentic writings. Nor can he be held responsible for the system of "Taoism" that is associated with his name. The 'Tao Té King,' traditionally from his pen, has been translated into English. Méncius (372–289 B.C.) expounded Confucius, and made his writings popular and the accepted criteria of China's thought. After his era, the chief literary events are, the burning of the books by Shi Wang Ti, who had abolished feudalism, built the Great Wall, put many literary men to death and destroyed much literature, in order to prevent, as he pretended, reaction to the old order of things; the coming of the Buddhists and the diffusion of Chinese culture through their efforts, not only in continental countries of Asia, but by their missionaries in neighbor lands and islands, from Japan to Java. Without disturbing or intermingling with the purely national product of letters, the stream of Buddhist literature, both original and in translation, has flowed on, instructing the masses of the people, whose thoughts, hopes and fears are saturated or colored by Buddhist conceptions. On the other hand, the Chinese scholars have held generally to the Confucian ethics, doctrines and philosophy, finding in the classics the basis of both erudition and culture and also of statecraft, ethics, sociology and religion. Nevertheless Buddhism has powerfully modified the thought and methods of Chinese thinkers. In the 12th century, after a prolonged outbreak of populism, the two systems, Confucianism and Buddhism, came to their final clash. A century of intellectual activity and profound thinking followed, during which China's foundations of ethical and intellectual concepts were re-examined, along with the claims of the rival religious systems. The result was a restatement of philosophy, which became the creed of educated men in all the countries of Chinese Asia. While claiming to be orthdox Confucianism, this representation of the old faith and traditions showed that the Chinese and Hindu cultures had combined. The two views of the universe were harmonized in the system of Chu-Hi, which, until recent years, in China and Japan, remained the accepted standard of intellectual orthodoxy. Another renaissance of philosophy in a more original form took place in the 15th century, when Wang Yang-Ming (Japanese Oyoméi) promulgated a system of idealistic intuitionalism. In this, the seat of authority was declared to be, not in the dicta of the ancients, nor in the sacred texts or inspired utterances of Confucius, but in the vision of truth, as dissolved through reason and tested by science and experiment. Man, by looking within, must find reality. Then, seeing the truth, he must act upon it. Discernment prompts duty. A clear vision of righteousness is a revelation from heaven. Thus, what begins in intuition becomes pragmatism in its noblest form. Though his system was at first branded as heresy and the author sent into exile among savages, Wang's doctrines became a cult, enthusiastically propagated by his followers, and, under later emperors, Wang Yang-Ming was canonized. About 1600 A.D. this philosophy, introduced into Japan and there developed and applied, was the efficient cause and instrument, excelling all others, in making modern Japan possible. Thence, reacting to China and kindling anew the older mass of thought, it has been powerful in making the Chinese Republic. A new infusion of thought and a fresh direction of the imagination were given, by the advent of the Mongols (1200–1368), who brought in the drama and the novel, which before had existed only in rudimentary forms. From this time, the theatre, whether permanent or itinerant, has existed in nearly every village, or is utilized for private amusement. The people go to see the actors more than the plays, each of which is usually less than an hour in length; though in public theatres many of these comedies and dramas — tragedy being non-existent — are linked together so as to make a day's performance. The manuscripts of the popular plays are in the possession of the families of the actors. The novel, coming through Mongol conquests from the homeland of stories, Central Asia, was in China gradually developed; until, from the 16th century, the people of China have been fed with fiction almost as generously as in Western lands. The Chinese romancer usually treats his themes under four or more heads: (1) Plots and Court Politics; (2) Love and Intrigue; (3) Popular Beliefs and Superstitions; (4) Violent Actions and Lawless Characters — the latter in great variety. In all the repertoire of Chinese fiction, the most popular one, in both China and the surrounding pupil nations, because of its easy fascinating style and multitude of constantly thrilling actions, is that of 'The Three Kingdoms,' describing their wars in the 3d century B.C. Other novels, which quite equal our most sensational and blood-stirring stories, rich in incident and action, are based on historical events, journeys to strange lands, real or imaginary, or legends illustrating or exaggerating wonders in nature and human history. Among the greatest literary events, of far-reaching importance to China, have been the journeys of passionate pilgrims to India, from which country after many years' stay and bibliographical collection, they brought back, from this Treasure Land in the West, books that mightily influenced the popular life of the Chinese. As in the similar case, of the Aryan and Semitic languages, in which, for example, are the drama of 'Sakoontala' and the 'Arabian Nights,' the Occidental scholars, naturally content with the classical literature, or products of erudition, have overlooked or ignored the humbler mental pabulum of the people. In modern and recent times, translations from standard Occidental literature, especially in philosophy, science, history, travels, biography and the monographs by native authors, on a vast variety of subjects of modern interest, have been numerous and widely circulated by Chinese publishers, and especially through the Society for the Diffusion of Useful Knowledge. Wall and fence literature, on every theme, practical, ethical and theoretical, still holds its own. Journalism, which has never been popular with men in office, who fear publicity, flourishes, and is notably on the increase. The native fictionists now borrow plots, themes and coloring from Western literature and often employ ideas, motives and moral coloring derived from Christianity. A new figure in the literature of the world is the native Chinese, educated abroad,

who writes not only on science and politics, using his own tongue and script, but wields a powerful pen in European languages, thus opening for us large windows into the mind of the Chinese, while enabling foreigners to understand their methods of thought and literary presentation, thus hastening the day of the union and reconciliation of the Occident and the Orient.

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WILLIAM ELLIOT GRIFFIS,
Author of 'China's Story in Myth, Legend, etc.'

CHINESE OLIVE, the fruit of *Canarium commune,* order *Amyridaceæ,* a tree of the Asiatic Archipelago yielding an oil which is used as a condiment and for lamps.

CHINESE PAVILION, a semi-musical instrument composed of a pole with several transverse brass plates of some crescent or fantastic form, generally terminating at top with a conical pavilion or hat. On all these parts are hung small bells, which the performer causes to jingle by shaking the instrument held vertically up and down. It is employed only in military bands, and is more for show than use.

CHINESE SWALLOWS' NESTS, curious productions, which sell at a high price in China, though they have no special points of recommendation beyond many other gelatinous ingredients in soups. They were formerly supposed to be made of some species of the rose-spored *Algæ,* as *Sphærococcus lichenoides;* but this is now ascertained to be a mistake, and it is known that they are formed of dried saliva from the mouth of the bird itself. The nests are the production of certain species of swifts (not swallows) of the genus *Callocalia* which breed in caves on islands of the tropical Pacific and Indian oceans. All species of swifts secrete an abundant mucous saliva which is utilized along with other materials in constructing the nests; but species of *Callocalia* only form their nests of saliva exclusively.

CHINESE TARTARY, an old name of Eastern or Chinese Turkestan.

CHINESE WHITE, a pigment prepared from the white oxide of zinc (ZnO), introduced into the arts in the latter part of the 18th century as a substitute for the preparations of white lead. Its color is not changed by exposure to air. It is used also as a water-color paint and in this form is known as body-color paint. Though it is not as heavy in body as white lead yet, when mixed with water colors, it renders them less transparent.

CHINESE WINDLASS, a differential windlass, in which the cord winds off one part of the barrel and on to the other, the amount of absolute lift being governed by the difference in the diameters of the respective portions. It is a good contrivance in the respect that great power may be attained without making the axle so small as to be too weak for its work.

CHING-HAI, chĭng'-hī', or **CHIN-HAI,** China, seaport in the province of Che-Kiang, about 18 miles from Ningpo. Ching-Hai has no foreign commerce of its own, not being a treaty port; but it is a resort for native traders from the Chusan Archipelago, and from here Chinese merchandise is sent to Ningpo. There is a missionary station and a native academy for students who compete in the civil service examinations at Ningpo. Pop. (1910) estimated 140,000, mostly Chinese. It was taken by the British in 1841.

CHING-TU, chĭng-too', China, city, capital of the province of Sze-Chuen, situated on the Min River, 150 miles from its junction with the Yang-tse-Kiang and 175 miles from the treaty port Chung-King. Ching-Tu is in one of the largest fertile plains of China, and is surrounded by mountains rich in the minerals of commerce. By way of the Min River and canals nearby, trade is carried on with the places in the valley of the Yang-tse-Kiang. The walls around the city are 12 miles in extent. Famous in Marco Polo's time, it is still one of the richest cities in China, with clean streets and canals. It has telegraphic and postal connection with many other places in the province, and railways to K'ui-chou-fu and farther east have just been completed. Good roads connect the city with Ichang and the Yang-tse ports. It has an arsenal with modern equipment, and goods of European manufacture are found in some shops. Pop. about 1,000,000.

CHINGLEPUT, chĭn-gŭl-pŭt', or **CHENGALPAT,** or **THE JAGHIRE,** India, a coast district in the province of Madras, area, 3,079 square miles, surface rocky, water scarce, crops scanty. In the fertile localities grain and fruits are raised which are shipped to the Madras markets. Some manufacturing of cloth is carried on. The chief towns are Conjeveram, Saint Thomas' Mount, Saidapet, Tiruvotiyur and Chingleput. This tract of country was obtained in 1760 and 1763 by the East India Company from the Nabob of Arcot. It was invaded by Hyder Ali in 1769 and again in 1780, when it was nearly depopulated by famine and emigration. Pop. 1,312,122.

CHINGLEPUT, or **CHENGALPAT,** India, town in the district of the same name, 15 miles west from the Bay of Bengal, 36 miles southwest of Madras, situated in a valley surrounded by hills. In 1751 it was taken by the French, retaken the following year by the British under Clive. A railroad enters the town. It has Roman Catholic and Protestant missions, hospital, the reformatory school of the Madras presidency, civil and criminal courts and a dilapidated fortress which at one time was of considerable extent and well fortified. Pop. about 11,000.

CHINIOT, India, town in the Jhang district of the Punjab, 80 miles west of Lahore. It is famed for wood-carving, and has manufactures of coarse cloth. Its trade, principally in wheat, cotton and other agricultural products, is of considerable importance. Pop. 15,685.

CHINIQUY, shē'-nē-kē', **Charles Pascal Telesphore,** Canadian clergyman: b. Kamouraska, Quebec, 30 July 1809; d. Montreal, 16 Jan. 1899. He was a Roman Catholic priest from 1833 to 1858, when he joined the Canadian Presbyterian Church. He lectured in England in

1860, 1874 and 1882 and in Australia 1878–80. He wrote 'The Priest, the Woman and the Confessional' (1874), a work that has had an enormous circulation in English-speaking countries, and has been translated into French, Italian, Spanish and Dutch; 'Fifty Years in the Church of Rome' (1886); 'Papal Idolatry' (1887); 'Forty Years in the Church of Christ' (1899).

CHINKARA, chĭn-kä'ra, the common gazelle of India. (See GAZELLE). Also the four-horned antelope, *Tetraceros quadricornis.* This animal is found in the hilly parts of India. It has the additional pair of horns above the hinder angle of the eyes. The female is hornless.

CHINOLINE, kĭn'ō-lĭn. See QUINOLINE.

CHINON, shē-nôṅ', France, antique town in the department of Indre-et-Loire, beautifully situated on the Vienne, 31 miles southwest of Tours. Crowning a lofty rock are the ruins of its vast old castle, the French Windsor of the Plantagenets, the death-place of Henry II, and later the residence of several French sovereigns, where, in 1429, Joan of Arc revealed her mission to the Dauphin. A farmhouse across the Vienne is pointed out as Rabelais' birthplace. Chinon has manufactures of druggets, serges, earthenware, baskets, wines, rope, etc. Pop. 5,943. Consult De Cougny, 'Chinon et ses monuments' (Chinon 1874).

CHINOOK, chĭ-nook' (Tsinúk, the Chehalis name of this tribe), the best known division of the Chinookan family. They held territory on the north side of the Columbia River, in Washington, from the mouth of the river to Grays Bay. They have become very much mixed with the Chehalis, a cognate tribe, and the language of the southern division of the Chinookan family has become practically extinct. The Chinook, owing to their proximity to the early settlement of Astoria, became well known to the whites; more especially so as the Chinookan tongue had already become the basis of a trade jargon which served as a medium of communication all along the Pacific Coast from California to Alaska. This jargon the white settlers, traders, merchants and trappers found it convenient to accept, as it enabled them to communicate not only with the Chinook but with all the other tribes who frequented the country about the mouth of the Columbia River for purposes of trade. The principal village of the Chinook was situated on Baker Bay, on the Pacific Coast, near the mouth of the Columbia River, a very advantageous position, as the Chinook were great traders and fishermen. Though they lived in villages of a more or less permanent character, they were, owing to the nature of their tribal occupation, given to considerable moving about; and their voyages were generally made by water—in dugouts, canoes of huge size and graceful form. The Chinook differ in size and appearance from the other tribes of the region lying about the mouth of the Columbia, being taller and having broader and higher foreheads and more arched noses. In all these respects they resemble the Kwakiutl of Vancouver Island. There are at least three distinct divisions of the Chinook Indians: the Chinook proper, the Upper Chinook and the Clatsop. The Upper Chinook and a part of the Clatsop still retain their Indian tongue, the former in a more or less pure state and the latter pretty well mixed with English and Chehalis. The Chinook seems to have been a numerous people. Lewis and Clark, who visited their country in 1805, state that they numbered 16,000. This estimate undoubtedly referred only to the Lower Chinook and did not include either the Clatsop or the Upper Chinook. The greater part of the Chinookan race was carried off by an epidemic, the nature of which is unknown (1829). This plague swept away whole villages and even sub-tribes are said to have disappeared before its ravages. (See CHINOOK JARGON). Consult Bancroft, 'Native Races of the Pacific States' (New York 1875).

CHINOOK JARGON, an Indian trade language probably of considerable antiquity, which is known to have been in use along the Pacific Coast of North America from California into Alaska for more than a century. It has had incorporated into it during that time numerous foreign words, but the body of the language is still essentially Indian. This jargon was named after the Chinook tribe at the mouth of the Columbia River, who first introduced it to the traders and settlers at Astoria. The white hunters, who entered the Columbia River region, accepted it as the easiest means of communication with the natives. This so-called Chinook jargon is made up of Chinook, Nootka, Salish and half a dozen other tribal tongues, and undoubtedly it had its origin in the extensive trading carried on all along the Pacific Coast, long before the first white man visited the mouth of the Columbia. It consisted of commonly recognized words and phrases, which have been variously estimated as numbering from 500 to 1,000. Among these there existed, at the close of the last century, a few French, English and Russian words and phrases; but the great body of the vocabulary was Indian, in which Chinook predominated. This Chinook lingua franca is rapidly disappearing from along the Pacific Coast, but it is spreading and growing in importance in the interior of Alaska, where it promises to be as useful in the development of trade and communication with the natives as it has been in the past in the regions from which it is now being crowded out. Apparently the Chinook jargon was never a steady quantity, for obsolete words form a part of the collection of almost all vocabularies made of it. Moreover, the jargon differed in different parts of the territory in which it was spoken. Consult Hale, Horatio, 'Manual of Oregon Trade Language' (1890).

CHINOOK WIND, a warm, dry wind from the Rocky Mountains over the plains that stretch from their eastern base. The moisture-laden winds from the Pacific Ocean striking the lofty barriers of the Cascade and Rocky Mountains are forced to precipitate their moisture as rain and snow. When the ranges are crossed the winds are cold and dry. Descending the eastern slopes of the mountains they become warmer, because in descending the air is condensed, the atmospheric pressure at the base of the mountains being much greater than at the summit. The winds are, however, still dry, all their moisture having been precipitated in crossing the mountains. In the descent of 10,000 feet or so to the plains of Montana and

the prairie province of Canada, the winds become so warmed by the increased pressure that they give a mild climate to regions far north. It is on account of these winds that cattle on the prairies of Alberta can graze in the fields all winter, a snowfall of a foot or more disappearing in a few hours before the warm, dry breath of the Chinook. Not all the warm winds of Montana and the regions north and south have their origin west of the Rockies. Various causes contribute to the formation of descending air, and when the descent is a number of thousands of feet, the winds resulting are always warm. Such winds blow over prairie regions west of the Missouri, but not always adjacent to the Rockies. Similar warm winds are known in other parts of the world, as in Switzerland, where they are called Föhn winds.

CHINQUAPIN. See CHESTNUT.

CHINS, or KUKIS, a tribe living in the mountainous region between Lower Bengal and Upper Burma. They form a collection of tribes belonging to the Tibeto-Burman group of the Indo-Chinese race, and consist of three divisions: Northern Chins, who inhabit the Chin Hills and a small part of the country to the north of them; the Central Chins (known as Kamis, Kwemis, Mros, Chinboks and Chinbons) live in the Pakokku Chin Hills and the northern Arakan district; and the Southern Chins of the Arakan Yoma. The Chins are, for the most part, a warlike race, divided strictly into clans over which their leaders and upper classes have almost despotic power and influence. They are uncleanly in habits, treacherous and given to intemperance.

CHINSURA, chĭn-soo'rā, British India, town beautifully situated on the Hugli, and now included in the town of Hugli, 20 miles north of Calcutta. It is a military station, was formerly a Dutch settlement and contains many neat houses in the Dutch style. The Armenian church, erected in 1695, is a building of great antiquarian interest. Chinsura is noted for the manufacture of cheroots, and has several schools, among them some belonging to the United Free Church of Scotland.

CHINTREUIL, shăn-trē'y, **Antoine,** French landscape painter: b. Pont-de-Vaux, France, 15 May 1816; d. Septeuil, 13 Aug. 1873. He was a pupil of Corot, obtained a medal at the Paris Exhibition, 1867, and that of the Legion of Honor in 1870. His sunlight effects have been greatly admired. The Louvre contains his 'Thicket With Deer' (1873); and his 'Rain and Sunshine' (1873), his best work.

CHINTZ (Hindu, *chint*, spotted, variegated), a cotton cloth gaily printed with designs of flowers, etc., in five or six different colors. The name was originally applied to a stained or painted cloth made in India. It was a favorite in the time of Queen Anne, long before cotton prints became cheap. The name, being highly respectable, has since been applied to goods lacking the graceful and artistic character of the genuine article. The Chintzes of the Coromandel coast were celebrated in the time of Marco Polo, 13th century. They are mentioned also by Barbosa, a Portuguese, who visited India soon after the passage of the Cape of Good Hope by Vasco de Gama: "Great quantities of cotton cloths admirably painted, also some white and some striped, are held in the highest estimation."

CHIO, kē'ō. See CHIOS.

CHIOCOCCA, kī-ō-kŏk'a, a genus of tropical plants of the family *Rubiaceæ*, consisting of small, often climbing, shrubs, with opposite stipulate leaves and bell-shaped or funnel-shaped, yellowish flowers in axillary clusters. The fruit is a white berry with two seeds. The bark of the root of *C. brachiata* is a violent emetic and purgative. It is also considered a remedy for snake bites by the people of Brazil.

CHIOGGIA, kyŏd'-jā, or **CHIOZZA,** Italy, important seaport town, 18 miles southwest of Venice, on an island at the southern end of the Venetian Lagoon, connected with the mainland by a stone bridge of 43 arches. It is founded on piles, has a beautiful cathedral; its harbor, the deepest in the lagoon, is guarded by forts and batteries. It is one of the strongest places in the Venetian lagoons. The cathedral dates from 1633, the Board of Trade building from 1322. The inhabitants have always been distinguished by quaint customs, costumes and dialect, and the fisheries have long been important. The other principal industries are flax-spinning, shipbuilding and the manufacture of sails, bricks, candles and lace. The rivalry of Genoa and Venice was decided here, 23 Dec. 1379, by the victory of the Venetian fleet. Pop. (1911) 35,052.

CHIOS, kī'ŏs (now called by the natives *Chio*, Italianized into *Scio*), one of the most beautiful and fertile islands in the Ægean Sea and archipelago, seven miles off the coast of Asia Minor, at the entrance to the Gulf of Smyrna; about 30 miles long from north to south, by 8 to 15 miles broad, with a coastline of about 110 miles, an area of 320 square miles and a population of about 74,000, almost all Greeks. The northern part is more mountainous than the southern part. The climate is delightful. Earthquakes are common, and one in 1881 caused the death of 3,558 persons, and the destruction of property to the value of over $15,000,000. The wine produced on the northwest coast, the *Vinum Arvisium* of ancient times, is still esteemed. Other products are figs, also noted in classical days; mastic, silk, lemons, oranges and olives. Goats' skins are also exported. The capital, Chios, about the middle of the east coast, contains about 13,000 inhabitants, and has a harbor touched by various services of steamers and doing a good trade. On the west coast is a rich monastery, Nea-Moni, founded in the 11th century. In ancient times excellent marble and potter's clay were quarried in the mountains, and recently pits of antimony and ochre have been worked.

Chios is one of the places which contended for the honor of giving birth to Homer. It formed in early times one of the most flourishing of the Ionian states and contributed 100 ships to the Greek force defeated by the Persians in the sea-fight off Miletus (494 B.C). After the Persian victory the town and temples of Chios were burnt and many of the people enslaved. In more recent times the island was taken by the Genoese (1346), and by the Turks (1566), in whose hands it remained up to 1913, except for a short interval. Revolting against Turkish rule in 1821–22, dur-

ing the Greek war for independence, the Chiotes were ruthlessly massacred and sold as slaves. During the Balkan War 1912–13, a Greek expedition wrested the island from the Turks, which by the treaties of London (May 1913) and Athens (Nov. 1913) was awarded to Greece. From 1914 during the great European War, Chios was the scene of considerable military and naval activity. See WAR, EUROPEAN.

CHIPMAN, Nathaniel, American jurist; b. Salisbury, Conn., 15 Nov. 1752; d. Middlebury, Vt., 15 Feb. 1843. He was an officer in the American army for a part of the Revolutionary War, and was admitted to the bar in 1779. He served as State's attorney for four years. In 1786 he was elected assistant judge of the Supreme Court; in 1789 chief justice and one of the commissioners to adjust the differences between Vermont and New York. In 1791 he was a member of the convention called to decide the question whether Vermont should accede to the Union, and a joint commissioner with Lewis R. Morris to attend Congress and negotiate for the admission of Vermont into the Union. In 1793 he published 'Sketches of the Principles of Government' and 'Reports and Dissertations.' In 1796 he was again elected chief justice of the Supreme Court and appointed one of a committee to revise a code of statute laws for Vermont. The revised laws of 1797 were written by him. He was a United States senator (1798–1803). In 1813 he was again elected chief justice of the Supreme Court. From 1816 to 1843 he was professor of law in Middlebury College. In 1833 he published 'Principles of Government: a Treatise on Free Institutions, Including the Constitution of the United States,' which contained portions of his former treatise.

CHIPMAN, Ward, Canadian jurist; b. Saint John, New Brunswick, 10 July 1787; d. there, 26 Dec. 1851. He was the son of Ward Chipman (1754–1824), a Massachusetts Loyalist who went to New Brunswick after the American Revolution. He graduated at Harvard in 1805, and succeeded his father as agent for the Crown in the Maine boundary dispute. After holding minor legal offices he became puisne judge of the Supreme Court (1825), and was chief justice of New Brunswick (1834–51). He was the last judge to sit in the provincial legislative council.

CHIPMUNK, an American ground-squirrel, a small animal of the genus *Tamias*, about six inches long, with a slender furred tail, nearly as long as its body, and a coat of reddish-brown fur, striped with white on the back; from the marking it is called *Tamias striatus*. The eastern species has two white stripes, and the western chipmunk, *Tamias quadrivittatus*, which is exceedingly common all over the Rocky Mountain region, bears four stripes. The ground color also is extremely variable according to habitat. This little creature is often found frisking along stone walls, stopping now and again to sit erect and dart sharp glances at moving objects. It is generally shy in the presence of man, and escapes with great rapidity, when need arises, into some hiding-place. Its home is a burrow in some woodland place, tunnel-like in structure, sometimes fully 20 feet long, and always deep enough to be below the frost-line. It is enlarged into chambers at intervals. One of these, supplied with dried leaves, grass and like material for bedding, is the sleeping apartment; the others are storehouses. In them the chipmunk stores his winter supplies of small nuts and acorns, especially the sweet beech-nuts. These he carries home, often several at a time, in his distensible cheek pouches. They are his chief food; but he will eat, also, buds, mushrooms and insects. The breeding season is in May; and the young are usually from four to six in number. The chief enemies of the chipmunk are the fox and the weasel. The former is dangerous only in the open, as he is too large to disturb the chipmunk at home. But the weasel can attack him in his burrow; and to escape him the chipmunk makes an opening for possible escape, at the far end of his burrow. For consideration of the various species of *Tamias*, consult Allen, J. A., 'Bulletin of the American Museum of Natural History' (Vol. III, New York 1890). Consult also Thompson, Seton, 'Life Histories of Northern Animals' New York 1909).

CHIPPAWA, chip'a-wā, Canada, village in the province of Ontario. It is situated at the confluence of the Chippawa and Niagara rivers, two miles above the falls, is the terminus of the electric railway from Queenston and contains an extensive steam-engine manufactory, and one of the largest factories of stoves in the province. On 5 July 1814 the battle of Chippawa (q.v.) was fought here between the Americans and the British, when General Brown defeated the English under Riall. Pop. 700.

CHIPPAWA, Battle of, 5 July 1814, an action of the War of 1812, remarkable for the defeat of a force of British regulars by an inferior number of Americans, in pitched battle on an open plain, without advantage of position and with weaker artillery. Major-General Riall, commanding the British forces, had about 1,500 line infantry — the King's regiment, the 100th, and the Royal Scots, with dragoons and artillerymen, and 600 skirmishers — north of the Chippawa River, which enters Niagara on the Canada side just above the rapids; the bridge from Chippawa village crossed it near its mouth. Joseph Brown's American force lay to the south beyond Streeter's Creek, and Brown started on the morning of the 5th to build another bridge across the Chippawa, to outflank Riall, whose skirmishers crossed the river and harassed the work of the camp from the woods on the west, and Peter B. Porter's militia brigade was sent to drive them out. As it approached the river Riall's army crossed the bridge on its right flank, and it fled in panic about 5 P.M. Riall thereupon deployed his force and advanced on the plain toward Brown. Scott's brigade of 1,300 was about to cross the creek bridge for a Fourth of July parade and, the creek being lined with woods, only learned of the danger at the last moment. Scott's troops crossed the bridge under fire and deployed beyond; while Scott threw his wings forward to avoid being outflanked, the left wing reaching into the woods. Both sides advanced, with pauses to load and fire, till the flanks touched and the centres were 200 feet off; when the British, unable to endure the deadly musket-fire in front and the

artillery now sweeping diagonally through the ranks, broke and ran for the Chippawa. The battle lasted less than an hour; and when Ripley's brigade came to Scott's aid the plain was deserted by the enemy. Riall lost 137 killed and 305 wounded of the regulars, nearly a third of his entire force, besides 73 skirmishers; Scott, 48 killed and 227 wounded; and Porter, 22 more. The victory was won by superior musketry and artillery. Consult Henry Adams, 'History of the United States' (Vol. VIII, Chap. 2).

CHIPPENDALE, Thomas, English cabinetmaker; d. London, November 1779. He is supposed to have gone to London from Worcestershire before 1750. The style of furniture named from him was less heavy and severe than that of his successors, and was elaborate, delicate and baroque, with classical tendencies. He wrote a 'Cabinet Maker's Director' (1752).

CHIPPENDALE FURNITURE. Thomas Chippendale was the son of a woodcarver of Worcester, England. The era in which this great cabinetmaker did his best work was from 1735 to 1760; then his production shows decline. His furniture shops and showrooms were in Saint Martin's Lane, the Strand, London. These furniture galleries were the rendezvous for the London Court's belles and beaux during the reigns of George II and George III; even royalty patronized his work. Being a woodcarver and son of a woodcarver his leaning was to that form of decoration. Fame gave him the term of "the great upholder" (upholsterers of that day were called *upholders*). Neither inlay or painting entered into his decoration, and the "serpentine" fronted sideboards ascribed to him (many experts declare) were the work of Heppelwhite or Shearer; in fact some even doubt whether Chippendale ever made sideboards. Mahogany was the popular furniture wood at this time, so that most of his pieces are in the American fine-grained "Spanish" mahogany; but some pieces are in walnut and rosewood. Chippendale brought out a book of patterns or examples of designs entitled "The Gentleman and Cabinet-Maker's Director," displaying engravings of styles he termed "Gothic, French and Chinese taste." They represent, in their hideous repulsiveness, nothing we know of as extant Chippendale pieces. Chippendale "Gothic," called also "Cathedral-Gothic," furniture arose (about 1760) when Gothic architecture was becoming fashionable; Chinese motifs soon became the fad, hence we find some pieces in composite Gothic and "chinoiserie." From the latter Chippendale used pagodas, mandarin hats, lattice, fret and other motifs. French style copied Louis Quinze, using the "opposed C's," etc. The *bombé*, or swelled front, is in this style.

Characteristic Productions. — If Chippendale did not make sideboards, he produced massive carving tables with marble or mahogany tops with "wine coolers" beneath or on the sides. Bureaus followed former oak and walnut varieties, but were of veneered or solid mahogany. A bookcase often figures on top with paneled or glazed fronts; the latter had beautiful lattice or tracery panes. Bookcases rarely had carving, but they were handsomely decorated with fretwork friezes, some had serpentine fronts (highly prized). A "broken" pediment is favored. Chippendale's tables were various: writing tables, tripod "tip-up" (tilting) or "let-down" with plain and "galleried" tops, molded rims, etc. His writing tables (called "pedestal") were generally very commodious. For card-playing "Chinese taste" or "lattice" tables were favorites. Chippendale period mahogany dining tables sell at moderate prices but his carved ones are costly these days; plain pieces, therefore, have often recent carving to enhance the price. His tilting tripod often shows very fine, carved decoration. Chippendale wardrobes were true masterpieces, nearly always having plain cornices even when elaborate carving adorns the rest of the piece. In the latter case Louis Quinze (see FURNITURE, EUROPEAN), feet are usual but in simpler pieces we find the plain French ogee feet. His chests of drawers have, generally, *serpentine* (waved) fronts and are equipped with handsome brass keyhole escutcheons and brass handles. The "high-boy," that came into being in the 17th century is still made. A much admired Chippendale piece is the settee. It is often of the "two-chair-back" and "three-chair-back" varieties fashionable in the Queen Anne period; being in such favor, and rare, there are many fakes on the market, usually made up from the backs of two or three *singles*, or perhaps from arm-chairs, for the originals were made specially and are wider even than the arm-chair backs. Imitations were made in Holland and Portugal but of inferior workmanship and much "rococo" elaboration that was foreign to Chippendale. In chairs Chippendale made two distinct varieties — the *plain* and the *fine;* the plain were for everyday use in the living rooms, the latter for display in the drawing-room. These chairs are in the following styles: Dutch (with pierced splats); "ladder-back"; "French manner"; Gothic or "Cathedral-Gothic"; "Chinese taste." A Chippendale chair innovation was the making of wider fronts (to allow for hoop-skirts) in combination with reduction of the breadth in the back. It is often erroneously claimed that Chippendale originated the *pierced splats*, which created such an appearance of lightness. There are however extant Queen Anne chairs which show perforation of the splat in an elementary form. As before, the arms of arm-chairs frequently reach only part of the way from the back to accommodate the ladies' skirts. The "claw-and-ball" foot of the Queen Anne period early in this era alternated with the ogee and the club-shaped feet with a ball beneath. The four-poster bedsteads of Chippendale are often very elaborate with their pierced-work cornices and Louis XV carved motifs, the foot-post receiving especial carefully carved decoration and massive claw-and-ball feet, but the characteristic Chippendale bed-post shows only slight enrichment and somewhat slender proportions. Those in Gothic and *Chinese taste* have square feet after 1750. Besides mahogany, these bedsteads are found in cherry, maple and birch. A popular piece of furniture of this period was the fire-screen. Chippendale made them in three styles — the tripod, "horse" and folding screen. The tripod ("pole-screen") had screens either banner or shield shape sliding up and down the poles; "horse" screens had two sup-

ports, each on four legs. Chippendale clock-cases are noted; these cases for "grandfather" or long-case clocks are mostly in the French style, rococo at first, then Gothic, followed by *Chinese taste*. Their decoration runs to fret-work more than carving, except those in the French style. His tea-caddies are in demand and show careful work from this master hand. Most are in Louis XV style with cabriole legs, ogee or claw-and-ball feet in chased brass. Their brass handles and key escutcheons were of exquisite design. Among other pieces of this master cabinetmaker we find consoles, window-seats (now very rare), dumb-waiters, etc. The Chippendale typical support is the cabriole ("bandy") leg surmounted by a scallop shell or acanthus drop; and his unique furniture leg is the "pierced square," the term describing the idea very graphically. His favorite motifs in decoration were: Scallop-shell, fret, endive, acanthus, dolphin, wyvern, ram's head holding swags, squirrel, crow, a bird with long tail and long bill, lion, masque, quatrefoil, ribbons, flowers, bells, pagoda, Chinese umbrella, canopy with bells at each corner, opposed C's of rococo style, eagle, etc.

"Irish" Chippendale.—Certain pieces of furniture consisting of side-tables (with mahogany or marble tops), china cabinets and clothes-presses, are met with in Ireland of construction, design and decoration similar to the work of Chippendale. Their source of creation has never been determined, even after much research. They show good workmanship, but these pieces when compared with true pieces of Chippendale the poverty of the carving as contrasted with the rich depths and sharp edges of the master's work stamps the piece as "Irish" Chippendale: all the carving is *flatter*. Other characteristics are found. Half way down the leg is a circlet or *garter* in relief. The scallop shell is on the top of the leg in true Chippendale style, but it is larger, more like that of the Queen Anne style. Grimacing masks appear on some pieces, some are slightly tilted out of the perpendicular. The reason for supposing these pieces of furniture are Irish creations is supported not only by the fact that they appear to have been all first discovered on that island, but also by the knowledge that the same dark grade of mahogany was imported to Ireland from San Domingo in West Indian trade.

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CLEMENT W. COUMBE.

CHIPPENHAM, England, municipal borough of Wiltshire, 13 miles northeast of Bath, on the left bank of the Avon, here crossed by an ancient stone bridge of 22 arches. It consists of one principal street, with others diverging from it. It contains two large parish churches with lofty spires, an old and a new town-hall, etc. The town was once the seat of important cloth manufactures, is an important mart for cheese and has malting and tanning industries, with stone quarries in the neighborhood. Bowood, the seat of the Marquis of Lansdowne, is three and one-half miles distant. Pop. 5,332.

CHIPPEWA, chip'pē-wā. (1) Michigan, an eastern county of the Upper Peninsula, bordering on lakes Superior and Huron, and bounded east by the river Saint Mary, and west by Luce and Mackinac counties. The surface is hilly and partly covered with forests of pine. Capital, Sault Sainte Marie. (2) Wisconsin, a county in the northwestern section, about 50 miles from the Mississippi River, traversed by the Chippewa and several affluents; area, about 4,300 square miles. Sandstone is abundant, and much of the surface is well wooded. Capital, Chippewa Falls.

CHIPPEWA, a river of Wisconsin, which has its rise in the north of the State, and after receiving several tributaries flows southwest into Lake Pepin, an expansion of the Mississippi.

CHIPPEWA (puckered up from roasting, a term said to have been derived from the peculiar puckered shape of their moccasins, which were gathered in front), a shortened form of Ojibway (ojib, to pucker, and ubray, to roast); one of the largest North American Indian tribes. They covered, at one time, over 1,000 miles of territory, from east to west. They were stretched along the shores of lakes Huron and Superior and spread westward across the intervening country into North Dakota. It is hard to define accurately the Chippewa country as the Chippewas blended readily, in the course of long years, with other members of the Algonquin race to which they belonged. Moreover they frequently changed their habitat in places. The Chippewa was one of the native races with which the French came early into contact; and so we have had frequent, though somewhat uncertain, accounts of them from French sources. They are known to have occupied considerable territory in Wisconsin, some of it as far back as the time of the discovery of America by Columbus. According to native tradition some of the Chippewa have lived in the territory in and around lakes Huron and Superior ever since the beginning of the race. At the time of their discovery they were a semi-civilized people, cultivating corn, beans and certain medicinal plants and collecting wild rice. They were forest dwellers and, even when they surged westward, they preferred to keep to the wooded country, though they emerged from it in places. They were a hardy race, good hunters, brave warriors and possessed of considerable intelligence. Their medicine men were famed throughout all the lake region and the eloquence of their tribal orators, the skill of their story tellers and the wisdom and cunning of their great tribal leaders still form the subject of the stories of the old men on the Canadian reservations.

The Chippewas drove the Foxes from northern Wisconsin about the beginning of

the 18th century and forced the Sioux across the Mississippi River. They continued their conquest until they reached Turtle Mountains in North Dakota and established their western headquarters near the head-waters of the Red River. In the meantime other Chippewa bands had entered western Ontario overrunning the peninsula between lakes Huron and Erie and forced the Iroquois to retire eastward. They were constantly at war with the white settlers as they attempted to move westward until 1815 when they made a treaty of peace with the United States government, which has been fairly well kept by them ever since. The Chippewas now in the United States are on reservations or on private lands in Minnesota, Michigan, Wisconsin, North Dakota and Kansas.

The Chippewas were always friendly with the French who gave them the reputation of being honorable and very faithful in the keeping of all their treaties and other obligations into which they had once entered. They were expert canoemen and made long voyages by water, often coasting for hundreds of miles along the shores of the Great Lakes, where, in the later days of their prosperity, they met friends everywhere. They were separated into more than a score of tribal divisions and were a fairly numerous people; though, on account of the extent of territory they covered, no accurate estimate of their numbers when they were a power in the land can be made. There are now about 33,000 Chippewas, one-half of which is in Canada and the other in the United States.

JOHN HUBERT CORNYN.

CHIPPEWA FALLS, Wis., town and county-seat of Chippewa County. It is on the Chippewa River, and the Chicago, Milwaukee, and Saint Paul and the Minneapolis, Saint Paul and Sault Sainte Marie railroads, 12 miles northeast of Eau Claire. It contains the County Insane Asylum, the State Home for the Feeble-Minded and a fine county courthouse. Tone Rock battleground, near the city, is of interest as the scene of a Sioux-Ojibway conflict. The city has fine water power, carries on a considerable trade in lumber, and manufactures beet sugar, chairs, sashes and doors, flour, shoes, gloves, beer, woolen goods, foundry products, etc. It is especially noted, however, for the pure spring water which is obtained from the Chippewa Springs and which is shipped to all parts of the United States and to the Orient. It has daily and weekly newspapers, two national banks and an assessed property valuation of $2,000,000. Settled in 1838, it was chartered as a city in 1870. The government is administered under a general State law by a mayor and a council. Pop. 8,893.

CHIPPING SPARROW, one of the most widely spread and familiar of North American sparrows (*Spizella socialis*), seen in summer by every roadside and in every garden of the United States east of the high plains and northward to Labrador and Great Slave Lake. The "chippy" is of small size, has the streaked brown and gray plumage of the sparrow and is to be distinguished at a glance by its chestnut cap and plain white breast. It comes from the south in early spring and makes its home fearlessly near the house, forming a neat nest in some bush or vine, where its pretty, trilling song is heard until late summer. The nest, made of grasses and fine twigs is always lined with horsehairs; and this sparrow is often called "hair-bird." The five eggs are greenish blue, sparsely speckled with brown. It feeds its young, of which two broods are frequently raised, on aphids, small caterpillars and other (usually injurious) insects; and at other times is a diligent eater of weed-seeds. Both these services contribute to the beneficial effect of its otherwise delightful presence, and its home, should be shielded from harm.

CHIPS FROM A GERMAN WORKSHOP, by F. Max Müller (5 vols.). A collection of special studies incidental to the author's editing of a library of the 'Sacred Books of the East.' The several volumes cover various fields, as follows: (1) 'The Science of Religion'; (2) 'Mythology, Traditions and Customs'; (3) 'Literature, Biography and Antiquities'; (4) 'Chiefly the Science of Language'; (5) 'Miscellaneous' and later topics. Although they are the result of "occasional work," their wealth of material and thoroughness of treatment, and the importance of the views presented, give them not only interest but permanent value. On many of the points treated, discussion is still open and some of the views advanced by Professor Müller may come into doubt; but his contributions to a great study will not soon lose their value.

CHIQUICHIQUI PALM, chē'kē-chē'kē (*Leopoldinia piassaba*), a native of Brazil, where it is called piassaba. It grows in swamps and along river banks. Its thin-stalked, pinnate leaves are used for thatching, and it is the source of a fibre which is used for making brushes.

CHIQUIMULA, chē-kē-moo'lä, Guatemala, Central American town in the department of the same name in the east of Guatemala, 55 miles northeast of the city of New Guatemala. It is in a mountainous region, has valuable mineral deposits and a delightful climate. Pop. 6,500.

CHIQUINQUIRA, chē-kēn-kē-rä', Colombia, South America, the largest town in the department of Boyacá, near the Suarez, 42 miles west of Tunja; was an Indian place of pilgrimage before the conquest. In the Dominican Conventual Chapel is a miraculous picture of the Virgin, and the place is visited annually by some 60,000 pilgrims. Its educational facilities are good, there being one state college, one private college of philosophy and letters, three colleges for women and one higher school for men. The permanent population is about 13,000.

CHIQUITOS, chē-kē'tōz, a race or stem of Indians inhabiting western Bolivia. The chief occupation of the people when first discovered by the whites was agriculture. They rejected Spanish rule and European customs until 1691, when the Jesuits established a mission among them. The soil here is rich, growing vanilla, indigo, cotton, sugar, etc.; but for want of markets there is little cultivation. The policy of the Jesuit missionaries has made the Chiquito language the predominant one among the natives. It is copious, and is said to have a separate vocabulary for female use. The size and decorations of the churches and the perfection of the church music in which the natives

take a part, are a curious monument of the perseverance of the Jesuit missionaries, which has succeded in implanting in the midst of these solitudes a fragment of European civilization. In the year 1767 the Jesuits were expelled from the place, by Spanish authority. Since then the Chiquitos have not prospered, and their numbers have decreased. They still cultivate the soil, which is fertile, growing vanilla, indigo, cotton, sugar, etc.; but for want of markets there is little ambition to raise large crops. The native population is about 22,000, distributed among 10 missions.

CHIRIMOYA, chē-rē-mō'-yä, **The Anona Humboltiana,** is considered by many to be the best of the indigenous fruits of America. The word is Aztec in origin and is said to mean "The fruit of the gods." So highly esteemed was it in the days of the Aztec empire that the districts of Mexico, famed for growing the best varieties of chirimoyas, were required to pay their full contributions to the Federal government in this fruit. The interior resembles uncolored ice cream in appearance and consistency, and for this reason English and American residents in the districts where the chirimoya is sold not unfrequently call it natural ice cream. The chirimoya grows in the hot-lands of its habitat and in the medium-temperate and the colder-temperate altitudes. It varies in size from that of a large apple to an ordinary pumpkin. It contains numerous large, dark, hard seeds.

CHIRIQUI, chē-rē-kē', Panama, formerly one of the administrative divisions of Colombia, adjoining Costa Rica; area, 6,500 square miles. It is well wooded, and has rich pasturage, especially on the Atlantic Coast, where the climate is very moist. The Cordilleras that occupy the interior reach their highest point in the volcano of Chiriqui (11,265 feet). Chief town, David. On the north coast is a spacious lagoon about 35 miles long and extending inland from 12 to 15 miles, with a depth of water for the largest ships. Pop. 45,000.

CHIROGALE, kī'rō-gāl, or **Mouse-lemur,** a small lemur of the genus *Chirogale,* native exclusively to Madagascar, especially *C. Coquereli.* It lives in trees and at the approach of the dry season curls up in a hollow place in a tree and sleeps until the rainless time is over. Like hibernating animals of cold regions, it accumulates a large deposit of fat before becoming torpid; and when it wakes it has regained its normal condition. It feeds on fruits and insects and builds a nest somewhat like a bird's. Four other species are known whose habits are similar, generally, to those of the lemurs (q.v.), especially the galagos, to which they are closely allied.

CHIROMANCY, kī'rō-măn-sĭ, the practice of attempting to foretell the future of a person by inspecting the lines of his hand, in the markings of which chiromancy professes to see a line of life and a line of fortune. In the general acceptation of the term, chiromancy, among students of the so-called art of palmistry, is restricted to the sense of foretelling the future by means of an examination of the palm of the hand, while *chirosophy* is applied to the interpretive science of the hand. It will be thus readily seen that the two terms have a tendency to overlap one another. As a science chiromancy or palmistry deals with the "seven mounts" of the hand, their lines and the interlacings of the latter. The names given to these mounts, Jupiter, Saturn, Apollo, Mercury, Venus, Mars and the Moon at once connect the practice of chiromancy with the art of divination as carried on by means of a study of the stars. The mount of Jupiter is situated at the base of the first finger; that of Saturn, the middle finger; that of Apollo, the ring finger; that of Mercury, the little finger; that of the Moon, the wrist; that of Venus, the thumb; while that of Mars is beneath that of Mercury. The system lays down four great lines: life, head, heart and fortune, the first three of which are termed "the trinity of human existence," that is to say, sensation, intelligence and action. Length of life, possibility of disease, ill health and other misfortunes are determined by the line of life which, following the mount of Venus, meets the line of the head; intellectual quality by the line of the head crossing the palm obliquely from Jupiter to Mars; estimation of character by the line of the heart crossing the hand horizontally from Jupiter to Mercury. While chiromancy as studied in the Middle Ages was, in some respects, almost as complicated as astrology, yet it was governed by the one general principle that strong, long lines indicated strength of character and were generally favorable, while short, obscure or ill-defined lines bore the opposite import. So it was with the mounts. All clearly-defined mounts denoted a certain quality in the individual, while the dimness or total absence of the mount indicated weakness or absence of the quality. In general the mount indicated the qualities connected in mythology with the character whose name it bore. Thus Jupiter denoted joviality, love, honor; Saturn, wisdom, prudence, success; Apollo, noble aspirations and love of the beautiful; Mars (the god of war), courage and resolution; Mercury (the culture god), love of science, industry, trade, commerce and the activities of life; the Moon (the goddess of dreams), a dreamy disposition and strong moral character; Venus (the goddess of love) amorous temperament and love for physical beauty. All these mounts were modified in an almost infinite variety of ways, by intersection of lines, shape of fingers formed by these intersections and their relation to one another, to the lines and to the mounts, as well as to the shape and formation of the palm, the fingers, the nails and other physical attributes.

Chiromancy is a very ancient practice and seems to have been at one time in pretty general use among most of the peoples of Europe, of India and of Egypt. It very probably had its origin in the ceremonies by the medicine men, diviners and priests of very primitive times, to determine good and bad omens. The Assyrians, Hebrews, Chaldæans, Greeks and Romans paid particular attention to the study of chiromancy. From a purely priestly institution it degraded until it became a tool in the hands of unscrupulous fortune tellers who were often as ignorant and credulous as their dupes. But before it arrived at this latter stage, it had reached a position where it was looked upon as being as exact a science and as worthy of careful study as any of the sciences of the age. Men of the highest rank, position, intelligence and educa-

tion gave their time to its study. Already, in the early Middle Ages, it had begun to claim the attention of the studious and, a little later, the art was being practised by a professional class, who took the place of the ejected pagan priests, and exploited the rich and poor alike. But all who practised palmistry were not of this class; for there were many who undoubtedly believed in the art, which was taught in schools and colleges. However, in an age of extreme ignorance, the temptation to exploit a willing public became gradually greater; and chiromancy degenerated into palmistry and the latter into "fortune telling".

CHIRON, ki'rŏn, in Greek mythology, the son of Kronos (Saturn) and Philyra. Kronos assumed the shape of a horse, in this amour, to deceive his wife Rhea. The shape of Chiron, therefore, was half that of a man, half that of a horse. In point of fact, Chiron was one of the Centaurs. He was celebrated through all Greece for his wisdom and acquirements; and the greatest princes and heroes of the time were represented as his pupils. He was particularly skilled in surgery. When Hercules drove the Centaurs from Mount Pelion, they took refuge with Chiron in Malea; but their enemy pursued them even into this retreat and unfortunately the old teacher was wounded with a misdirected arrow. The speedy operation of the poison in which the arrow had been dipped rendered remedies useless; and Chiron suffered the severest torments. The gods, at his prayer, put an end to his life, though his nature was immortal by reason of his descent from Kronos. After his death he was placed among the stars and became the constellation Sagittarius.

CHIROPODY, the treatment by experts, male and female, of hand and human foot diseases and malformations, first becoming definitely known to science in the latter part of the 18th century. In 1785 a publication appeared in London under the title 'Chiropodologia,' treating in a scientific manner the causes of corns, warts, bunions, etc., with a detail of the most successful methods of removing all deformities of the nails and of preserving or restoring to the feet and hands their natural soundness and beauty.

When this and subsequent announcements of a similar nature first became known, the name was made the subject of much jesting and adverse criticism. In a magazine then current the name was condemned as "new-fangled." This evidently did not discourage the cultivators or patrons of the science, for during the same year, or early in 1786, a "chiropodist" opened his establishment in the English capital and did a thriving business.

By degrees the idea of having special care taken of the hands and feet spread throughout Great Britain. One hundred years after the establishment of a "Chiropodical Establishment" in London, a novelist in a magazine story referred to a lady who had "finished her chiropodistry," and in the same year a popular London weekly, by referring to the operations of chiropodists as "chiropody," gave the stamp of authority to that name as expressive of the craft specialty.

During the past 10 years chiropody has made vast strides in popular estimation as a useful if not essential factor in the acquisition of perfect personal comfort and cleanliness. In all large cities the list of operators in this line includes many men and women highly skilled in the proper treatment of diseased and mal-formed hands and feet. This is particularly true of the United States, notably New York city, where all barber shops of any pretensions now have a woman in attendance who undertakes to cleanse and purify the hands of customers while they are under the soothing influence of razor and lather brush.

Latterly there has been a clear distinction drawn between the specialists who, like the women who have their headquarters in the palaces of tonsorial artists, attend only to the hands, and others, mostly men, who give their attention principally to the feet. The former announce themselves to be "manicures," the latter "chiropodists." The chiropodist, as a rule, is fully qualified in both divisions of the work.

The service of chiropodists and manicures has become so essential and elaborate that it now embraces an extended vocabulary of its own. Surgical instrument makers have a special department for implements used by chiropodical operators. The skill with which these implements, many of them of razor-like keenness, are manipulated by competent operators is little short of marvelous. Holding the hand or foot of the subject gently, yet with a vise-like grip, they deftly turn their wrists to bring the instruments exactly to the required position around or beneath each nail, and, although the slightest error in movement may mean the crippling of the person under treatment, accidents of any kind are very rare indeed. See BUNION; CORN; NAIL; WART.

CHIROPRACTIC. Defined.— Chiropractic is a name given to the study and application of a universal philosophy of biology, theology, theosophy, health, disease, death, the science of the cause of disease and art of permitting the restoration of the triune relationships between all attributes necessary to normal composite forms; to harmonious quantities and qualities by placing in juxtaposition the abnormal concrete positions of definite mechanical portions with each other, by hand; thus correcting all subluxations of the spine, atlas to coccyx inclusive, for the purpose of permitting the re-creation of all normal cyclic currents, through nerves, that were formerly not permitted to be transmitted, through impingement, but have now assumed their normal size and capacity for conduction as they emanate through intervertebral foramina — the expressions of which were formerly excessive or partially lacking — named disease.

Historical.— The first Chiropractic adjustment of a vertebra was given in September 1895, by Dr. D. D. Palmer. Neither the art nor science was formed at this time. Its growth remained practically dormant till 1903, since which time his son, B. J. Palmer, D.C., Ph.C., has developed it into a well-defined nontherapeutical philosophy, science and art that has no resemblance to any therapeutical method. Health (equality) is restored by completing the mental and physical circuits; restoring the currents of cycles of mental impulses acting through the material agency; to replace the full quota of positive with an equivalent negative; permitting the conveyance of the intelligent immateriality into the mechanical corporeal; to

reconstruct the normal psychophysical unit; to make as one the triunity of creation, transmission and expression; to re-establish equilibrium between the abstract and concrete, all of which is induced by replacing specific disordered concrete mechanical anatomy which permits adjustment between that one law of two principles — cause and effect — the rules and manner of declaration of which are unique and unlike any theories of stimulative or inhibitive movements or applications used by any other school.

Premise.— "And in the beginning, God," as true to science as philosophy. Decapitate a man — he's dead, showing that life centres in brain and is there known as mind; passes to spinal cord and is there known as nerve force; thence to spinal nerves, there known as mental impulses.

To section spinal cord induces degeneration, pressure upon spinal cord induces paralysis; constriction upon a spinal nerve causes disease to all tissues beneath. Section, pressure and constriction are relative terms, each producing its degree of effect.

The steamfitter closes a valve to shut off steam; plumber shuts a faucet to diminish flow of water; electrician turns off the button to stop the flow of electricity; the same is also true of man, as above outlined, any section, pressure or constriction reduces the flow of life from brain (where originated) to tissue cell (where expressed) as function.

Section is impossible except with surgery or murderous intents; pressure impossible except by traumatic fractures or dislocations; constrictions though are frequent occurring with everybody, no vertebrate excepted.

The brain is encased within a solid bone, the skull; the spinal cord passed through the spinal foramen where fractures or dislocations are rare but subluxations of vertebræ are frequent and therein enters constriction.

These vertebræ are 24 in number, separate from each other, they become subluxated by jars, twists, wrenches, strains, etc., thereby decreasing the lumen from which issue spinal nerves on each side on their way to every tissue of a body. This orifice is formed by notches of two vertebræ in juxtaposition. Nerves, passing through (being soft and entirely surrounded by two movable hard substances) should one of its halves become distorted it decreases the lumen and, the nerves having no avenue to escape, become constricted. Constriction does to nerves what a foot upon a hose would do — decreases the diameter and circumference, thereby diminishing the carrying capacity, the distant manifestation being notably observed by the physician in pathology and felt by the patient in symptomatology.

The subluxation could be at 3d lumbar — the effect noticeable at ankle, three feet away. The Chiropractor palpates for this vertebral subluxation, finds it, adjusts it, opening the foramen, releasing the pressure upon the nerve, permitting carrying capacity to reach normal, nerve force flows to affected part — health is restored.

This would take place in exact inverse ratio as the steamfitter opens a valve to let steam flow to produce heat; or the plumber opens a faucet to permit a full stream of water to flow to water flowers; or the electrician turns on the button to permit electricity to return to the globe for light.

Ease resides in origination, dis-ease in periphery. That cause which makes ease dis-ease is on the path between. As electricity exists in only three degrees, viz., enough, not enough or too much, so life exists in three degrees; balanced, in minus or excess. Endless complications, that seem to exist, represent not enough life (e.g., constipation) or too much (e.g., diarrhœa).

Chiropractic finds the cause of every disorder — adjusts it. That which confuses and has bewildered the masses for ages is now a simple process. Physicians have studied expressions. Chiropractic investigates source and transmission.

Chiropractic is an art, science and philosophy of locating and adjusting causes rather than treating effects; a process of restoration of life rather than stimulating and inhibiting effects present in an organ. Chiropractic is based upon the clinical hypothesis that man is a triune being; spiritual, mechanical and chemical; rather than the laboratorical deduction that he is but chemistry and physics. That which cures or heals is Innate Intellectuality which resides within the body of the patient; not any thing that may be taken from outside inward. The chiropractor opens the channels, intellectual life flows in quantity and speed intuitively — health is the inevitable result.

Statistics.—At the present time there are between 8,000 and 9,000 chiropractors in the United States. One or more are located in 19 foreign countries. The attendance in the various competent schools is over 1,300 annually. Chiropractors have now received licenses in several States and a number of States have chiropractic bills and examining boards. Among the latter are Connecticut, Nebraska, Kansas, North Dakota, Oregon, Arkansas and New York. The chiropractors in their legislative policy are opposed to any one method being placed in dominance over any other method. They hold that each method best knows its problems, therefore can best regulate them if given control of the same by State legislative enactment. Chiropractors through their national organization have been successful in 85 per cent of actions in showing that chiropractic was not the practice of osteopathy or medicine. There are several scientific journals published devoted to the development and advancement of Chiropractic. Conventions are held. Each State and many cities have thoroughly established societies.

Educational.— There are several competent schools. The Palmer school of Chiropractic at Davenport, Iowa, is the oldest and one of the largest. The course of study in these institutions in point of hours equals 4,037, which is slightly in excess of the average four years medical school excluding the hours used in medical schools for materia medica, major surgery, etc. Studies taught are anatomy, physiology, symptomatology, pathology, minor surgery, obstetrics, microscopy, chemistry, bacteriology, gynecology, biology (in addition to which are those original to Chiropractic, viz., cycles, equations, metric system, serous circulation, intellectual adoption, adjustment, palpation, nerve tracing, analysis, chiropractic orthopedy, anomology, restoration, spinography, etc. Among the other modern good schools is

the Universal Chiropractic College, also located at Davenport, Iowa; The Pittsburgh College of Chiropractic; The Carver Chiropractic College; Oregon Chiropractic College; Rutledge Chiropractic College. These institutions maintain a residual course of sufficient length in which 100 per cent of attendance is required.

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B. J. PALMER, D.C., Ph.C.,
President of the Palmer School of Chiropractic, Davenport, Iowa.

CHIROSOPHY, the interpretive science of the hand. See CHIROMANCY.

CHIROTES, in zoology, a genus of Saurians, resembling the *Cholcides* in their verticillated scales and the *Amphisbæna* in the obtuse form of their head; but distinguished from the former by the want of posterior feet, and from the latter by their possession of anterior limbs. There is only one known species, a native of Mexico, *Chirotes canaliculatus* (Cuvier). It is about the thickness of a man's little finger, and from 8 to 10 inches long. Body flesh-colored, and covered with demi-rings on back and belly, alternating on the sides; eye very minute.

CHIRU, chē'roo, a large antelope (*Pantholops hodgsoni*) native to the plateau of Tibet, found at an elevation of from 13,000 to 18,000 feet. It is about 32 inches tall, and pale in color. The buck has a black face, and long horns like those of the gazelle; the doe is hornless. It is wary to a degree that makes the autumnal hunts of the native a matter of patience as well as of skill. It has a thick covering of woolly hair of fawn-gray color. This fine antelope is related to the saiga of eastern Russia.

CHISEL, an edged tool for cutting wood, iron or stone, operated by striking its upper end with a hammer or mallet, or by pressure. The form of chisel used in carpentry is the most familiar; one used in turnery has the cutting edge in the middle of the thickness, one used in metallurgy has the upper part flat for receiving the blow of the hammer, and the lower part in the form of a wedge for penetrating iron plates or bars. Some of the "celts" found in Europe in prehistoric times are believed to have been used as chisels, and these tools were known also to the ancient Egyptians. In ancient times chisels were made of stone and later of various kinds of metals. The more civilized of the native tribes of America were acquainted with the chisel. The Aztecs, Zapolecas, Mixtecas and races of Yucatan, Guatemala and other parts of Mexico made chisels of copper and stone.

CHISELMOUTH. See CHUB.

CHISHOLM, Jesse, pioneer, guide, scout, interpreter and trader: b. Tennessee about 1806; d. March 1868. His father was a Scotchman and his mother a Cherokee Indian. He migrated to the West while the Cherokees occupied lands in Arkansas, being mentioned as one of the members of the tribe which accompanied Captain Dutch on his punitive expedition against the Towakony Indians in Texas, about 1827. He was one of the interpreters in the council held with the Wichita, Kiowa and Comanche tribes in the Red River country by Col. Henry Dodge and Gov. Montfort Stokes, in 1834, and was prominent as a mediator in most of the councils, negotiations and treaties made between the government and the wild tribes of the Southern Plains from that time on. He became a trader among the Comanche, Kiowa and other tribes of the plains, and during the course of his trading expeditions he rescued by ransom nine captive children and youths (mostly Mexican) all of whom were adopted and reared in the family with his own children. His home was at Camp Holmes, on the Canadian River. He also established and maintained trading posts near the present towns of Lexington and Oklahoma City. At the outbreak of the Civil War he was for a time prevailed upon to aid the Confederate authorities in negotiating treaties of alliance with various tribes in the Indian Territory but, in the latter part of 1861, was found among the refugee Indians who followed Opothleyahola northward to an asylum in Kansas. Tiring of life in the refugee camps, he soon drifted westward to the mouth of the Little Arkansas, where the Wichita and affiliated tribes of Indians had settled temporarily and where he engaged in trade. In the spring of 1865, he went south from the Arkansas to the valley of the upper Washita on a trading trip, the road over which he traveled being ever afterward known as the Chisholm Trail, destined to become famous during the days of the overland cattle traffic. In the autumn of that year he was active in persuading the hostile Comanche and Kiowa leaders to attend the peace council at the mouth of the Little Arkansas. He was reputed to have a speaking knowledge of 14 Indian languages, hence the frequent demand for his services as an interpreter by army officers, explorers and surveyors. Consult Lieutenant Whipple's narrative in the 'Pacific Railway Reports,' also 'Kansas Historical Society Collection' (Vol. V, pp. 90, 93; Vol. VII, p. 486; Vol. VIII, p. 177); also Andreas's 'History of Kansas' (p. 1385).

CHISHOLM, William Wallace, American official: b. Morgan County, Ga., 6 Dec. 1830; d. De Kalb, Miss., 13 May 1877. After the Civil War a fusion of white Unionists and negroes elected him sheriff. In 1877 a long standing personal and political feud between Chisholm and an opposing faction, led by John W. Gully, came to a head. On 26 April Gully was waylaid and murdered. His friends accused Chisholm and his party of the crime. Chisholm and four others were arrested on the morning of 29 April, and his wife, daughter and son accompanied him to jail which was shortly after attacked by the mob; Chisholm and his daughter receiving wounds that later proved fatal, while the son was killed in his father's arms by a shot from one of the leaders of the assailants. In December 1877, Walter Riley, a negro, confessed that he had murdered Gully, and denied any knowledge or complicity on the part of Chisholm or the latter's associates. Consult Wells, 'Chisholm Massacre' (1878). 'Kemper County Vindicated' gives the Democratic side of the affair.

CHISHOLM v. GEORGIA, in the United States Supreme Court, the case which led the several States to protect themselves from legal responsibility to individuals, while retaining legal powers of aggression. The constitution provides (Art. iii, sec. 2): "The judicial power shall extend to all cases — between a State and citizens of another State." Under this provision Maryland was sued soon after the adoption of the constitution, and acknowledged process by her attorney-general; but the case was compromised, and the question of jurisdiction did not come up. On 11 July 1792, Alexander Chisholm of South Carolina, as legatee in an inheritance case, served a process on the governor and attorney-general of Georgia to appear before the August term of the Supreme Court. Georgia instructed its attorney-general not to appear, and its counsel to enter a denial that States could be sued by individuals, or that the Supreme Court had jurisdiction in such cases, but not to argue the case. Chief Justice Jay and all the court, except Iredell of North Carolina, found that the court had such jurisdiction; and a writ of inquiry was issued, but not served because Georgia passed an act making service of it a capital offense. Virginia was as angry as Georgia; and the Eleventh Amendment to the constitution was introduced into Congress, passed by two-thirds of both Houses 5 March 1794, ratified by the States and declared in force 8 Jan. 1798. It reads: "The judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against one of the United States by citizens of another State, or by citizens or subjects of any foreign state." Efforts were made to get around this Federal law by having a citizen assign his claim to the State of his domicile and having the suit then brought in the name of this State. But it was held that this could not be done (New York v. Louisiana).

CHISLEHURST, England, town in Kent, 11 miles southeast of London. It was long the residence of Camden, the antiquary, and was the residence of Napoleon III from his dethronement till his death in 1873. His body and that of the Prince Imperial (killed in Zululand in 1879) reposed here until their removal to Farnborough in 1888. Pop. 8,666.

CHISLEU, CHISLEV or **KISLEV,** in the Jewish calendar the third month of the civil and the ninth of the ecclesiastical year. The name was not adopted till after the captivity, and does not occur in the canonical Scriptures. Chisleu begins with the new moon of December. The feast of the Dedication of the Temple began on the 25th of Chisleu, and continued for eight days.

CHISWICK, England, town of Middlesex, on the Thames River, seven and one-half miles west-southwest of Saint Paul's, London; contains a church said to date in part from the 12th or 13th century, charity schools established in 1707, gardens of the Horticultural Society and the grave of Hogarth. Fox and Canning both died at Chiswick House, the seat of the Duke of Devonshire. It has a considerable brewing and extensive trade in market gardening. Large open air baths were here erected in 1910. Pop. 38,772.

CHITALDRUG, a town in Mysore, British India, capital of a district of the same name, 128 miles north-northwest of Seringapatam; noted for its great fortress, which was unsuccessfully attacked by Hyder Ali in 1776, captured by him in 1779, and made the place of imprisonment of General Matthews by Tippoo Sahib in 1783.

CHITIN (Gr. *χιτων,* tunic), or **CHITINE,** kī'tin ($C_{15}H_{26}N_2O_{10}$), the horny substance which gives firmness to the tegumentary system and other parts of the *Crustacea, Arachnida* and insects; probably also the carapace of the *Rotatoria* consists of it. It is left when the above structures are exhausted successively with alcohol, ether, water, acetic acid and alkalis. It is colorless and amorphous, and is usually classed a proteid. It is dissolved by concentrated mineral acids without the production of color. It is not dissolved by solution of potash, even when boiling; neither does it give the characteristic reactions with Milton's or Schultze's tests.

CHITON, kī'tŏn (Gr. *χιτων,* tunic), a genus of Mollusca and the common name of the same, the shells of which are boat-shaped, and consist of a median series of symmetrical plates, folding over each other, and implanted in the mantle, the marginal zone of which is studded with spicules. It is the typical genus of the family *Chitonidæ* of the class *Amphineura.* The chitons cling firmly to rocks, etc., by means of the powerful foot, many of them resisting the heaviest beat of the surf. Only very small species (*Chætopleura,* etc.) are found on the eastern Atlantic Coast, but larger species occur in Florida and the Gulf of Mexico, while California has the giants of 8 or 10 inches of the genus *Cryptochiton.* Consult Cooke, 'Mollusca' (New York 1895).

CHITON, kī'tŏn, the undergarment of the ancient Greeks. In the earliest times it was worn by the men only; in later times there were two forms, and the chiton was worn by both sexes. The Dorian chiton was sleeveless, reaching about to the knees, and usually left more or less open on the right side. The Ionian was a long tunic reaching to the feet, closed on the sides, sometimes sleeveless, but often with short or long sleeves. Both forms were usually worn belted in at the waist.

CHITOR, or **CHITTORE,** India, a town and fort of Hindustan, in the native state of Oodeypore, Rajputana, on the Gamneri River, about 70 miles northeast of the town of Oodeypore. The town was for several centuries capital of Oodeypore, and was far more prosperous and wealthy than it is at present. It still contains many temples. The fort, formerly considered one of the strongest in India, stands upon a high rock overlooking the town. Pop. 15,108.

CHITRAL, chit-räl', British India, a native state, having Yasin and Gilgit on the east, Swat, Dir and Bajaur on the south, Kafiristan on the southwest and the Hindu Kush Mountains on the north and northwest. Through it flows in a southwest direction the Chitral or Kunar or Kashkar River, a tributary of the Kabul, and on it, in about lat. 36° N., stands the town of Chitral at a height of more than 5,000 feet above sea-level. The people are Moslems, but

mostly speak a language closely akin to that of their neighbors in Kafiristan. Upper Chitral, with its capital, Mastuj, is closely connected with Gilgit. Lower Chitral enjoyed till recent times undisturbed independence; but in 1894 an English resident and small body of troops were surrounded and besieged in Chitral, the consequence of which was that in March 1895 an expedition was sent (the main body by the Swat Valley, the other from Gilgit), which after some sharp fighting advanced triumphantly through extremely difficult country, relieved the besieged and annihilated all opposition.

CHITTAGONG, India, district in the presidency of Bengal, Hindustan. The district has Tipperah on the north, the Chittagong Hill Tracts on the east, Arracan on the south and the Bay of Bengal on the west. Its area is 2,492 square miles, and it has a population of 1,508,433. The Blue Mountains, on the northeast, attain a height of 5,600 feet. The principal river is the Karnaphuli, or Chittagong. The level lands, chiefly on the coast, and the valleys are very fertile. The principal exports are timber, canvas, coarse cloths and elephants. A considerable majority of the inhabitants are Mohammedans. The city of Chittagong, the capital of the district, is situated on the right bank of the Karnaphuli, 12 miles from its mouth and 220 miles east of Calcutta, and is the second port of Bengal. It consists of a series of detached houses on little hills. Although its climate is unhealthful, it is an important industrial and trade centre, among its exports being rice, jute, jute manufactures and tea. Pop. about 25,000.

CHITTAGONG WOOD, the wood of several Indian trees, especially of *Chickrassia tabularis*, of the family *Meliaceæ*. It is a light colored beautifully grained wood used by cabinet-makers. It is light in weight but does not wear well in changeable climates, as it warps in dry weather. The wood of *Cedrela Toona* receives the same name.

CHITTAM-WOOD, or AMERICAN SMOKE-TREE (*Cotinus cotinoides*), belongs to the sumac family. It is a small tree with wide-spreading branches growing to the height of about 40 feet. It grows in Tennessee and Alabama and westward to Missouri and Oklahoma. A rich dye for commercial use is extracted from the orange-yellow wood, which weighs about 40 pounds to the cubic foot.

CHITTENDEN, Frank Hurlbut, American entomologist: b. Cleveland, Ohio, 1858. He was educated at Cornell University, was editor of *Entomologica Americana* in 1890, and in the following year was appointed assistant entomologist in the United States Department of Agriculture. He has written several department bulletins on insect pests, including 'The Colorado Potato Beetle' (1907); 'The Harlequin Squash Bug' (1908); 'The Common Red Spider' (1909); 'The Asparagus Miner' (1911); 'The Broad-Bean Weevil' (1912); 'The Potato Tuber Moth' (1912); 'The Spotted Beet Webworm' (1913).

CHITTENDEN, Hiram Martin, American military engineer: b. New York, 25 Oct. 1858. After graduation from the United States Military Academy (1884), he rose through various grades to be lieutenant-colonel of volunteers and chief engineer of the 4th army corps in the Spanish-American War in 1898–99. He retired as brigadier-general in 1910. He has supervised engineering government works in the Yellowstone National Park and elsewhere, and has published 'The Yellowstone National Park: Historical and Descriptive' (1893); 'Reservoirs in the Arid Regions' (1897); 'Reservoir System of the Great Lakes' (1898); 'The American Fur Trade of the Far West' (1901); 'War or Peace' (1911); 'Water Supply System of the Spring Valley Company' (1912); 'Letters to an Ultra-Pacifist' (1916).

CHITTENDEN, Russell Henry, American university professor and director: b. New Haven, Conn., 18 Feb. 1856. He was graduated with the degree of Ph.B., at Sheffield Scientific School (Yale), 1875, Ph.D., 1880; Heidelberg University 1878–79; (LL.D., University of Toronto, 1903; Sc.D., University of Pennsylvania, 1904; LL.D., University of Birmingham, 1911; Washington University, 1915). He became assistant 1875–77, instructor 1877–78, 1879–82, and professor of physiological chemistry in 1882, and director of the Sheffield Scientific School, Yale, in 1898. He was lecturer on physiological chemistry at Columbia 1898–1903, and is member of referee board of consulting scientific experts to the Secretary of Agriculture, member of the National Academy of Sciences, American Philosophical Society; president of the American Society of Naturalists, 1893, American Philosophical Society, 1895–1904, American Society of Biological Chemists, 1907. He is author of 'Digestive Proteolysis' (1895); 'Studies in Physiological Chemistry' (4 vols., 1884–1901); 'Physiological Economy in Nutrition' (1905); 'The Nutrition of Man' (1907), and also many papers on physiological subjects in American and foreign journals.

CHITTENDEN, Thomas, American colonial and State governor: b. East Guilford, Conn., 6 Jan. 1730; d. Williston, Vt., 24 Aug. 1797. He was one of the pioneers of Vermont, settling upon the New Hampshire grants in 1774, and acquiring a fortune from his lands. In 1778 he became governor of Vermont, before its formal separation from New York was recognized. During the Revolutionary War the English and the Continental Congress received overtures from him, his terms being recognition of Vermont's statehood. He retired from public life in 1796.

CHITTIM. See KITTIM.

CHITTOOR, chit-toor', or **CHITTUR**, India, a town 100 miles west of Madras. It contains courts and public offices, an English church and a Roman Catholic chapel. Until 1908 it was the capital of the North Arcot district. Pop. 15,108. There is a town of the same name in the state of Cochin, Madras, with about the same population.

CHITTY, Joseph, English lawyer and legal writer: b. 1776; d. London, 17 Feb. 1841. He acquired great reputation by his legal textbooks. These comprise a 'Treatise on Bills of Exchange' (1799); 'Treatise on the Parties to Actions and to Pleadings' (1808); 'Treatise on the Law of Nations' (1812); 'A Treatise on the Criminal Law' (1816); 'Treatise on Com-

mercial Law' (1818); 'Collection of the Statutes of Practical Utility' (1829–37); 'Treatise on Medical Jurisprudence' (1834).

CHIUSI, kyoo'sē, Italy, town in the province of Siena, 102 miles north-northwest of Rome, on an olive-clad eminence in the Val di Chiana, not far from the small Lago di Chiusi. In ancient times, under the name of Clusium, it was one of the 12 republics of Etruria, and the residence of Lars Porsena. When Italy was overrun by the barbarians, it fell into decay, the whole valley was depopulated, and became the pestilential pool described by Dante. Since the improvement of the course of the Chiana, Chiusi has begun to flourish again along with the whole district. It is in connection with the discovery of Etruscan antiquities, however, that the place is chiefly heard of. During the 19th century immense quantities of these remains were found in the neighborhood in the grottoes that served the ancient Etruscans as tombs. They consist chiefly of sun-dried, black earthenware vases, ornaments, relievos and carved stonework, and are preserved in the museums at Chiusi and Florence. These objects represent Etruscan products and imports from Greece. The earliest graves show no Greek wares and must reach well back into the 8th century B.C. Succeeding graves contain Greek vases of the 7th century and from the beginning of the 6th century are found the chamber tombs, often richly decorated. Three thousand Etruscan and 500 Latin inscriptions have been found in Clusium. Beneath the town is a series of underground passages which seem to belong to the old Etruscan system of drainage. Pop. 6,000. Consult Dennis, 'Cities and Cemeteries of Etruria' (London 1907); and Giometti, L., 'Guida di Chiusi' (Poggibonsi 1904).

CHIVALRY (Fr. *chevalerie*, from *cheval*, Lat. *caballus*, "a horse"), a term which indicates strictly the organization of knighthood as it existed in the Middle Ages, and in a general sense the spirit and aims which distinguished the knights of those times. The chief characteristics of the chivalric ages were a warlike spirit, a lofty devotion to the female sex, a love of adventure and a thirst for glory.

To explain the nature and origin of chivalry we must consider the character of the ancient German tribes. The warlike spirit was common to them with other barbarous nations; but there were certain traits in their character peculiarly their own. Among these was their esteem for women. This is dwelt upon by Tacitus, and is sufficiently apparent from the early native German historians. This regard for the female sex was diffused by them through every country into which they spread, though with considerable difference in the forms in which it developed itself. In France it became that refined gallantry for which the nation has been so long conspicuous; in Spain it assumed a more romantic and glowing character, displaying much of the fire of Oriental feeling; in Germany itself it became faithful and tender attachment to the wedded wife. Engrafted upon this primitive regard for woman amongst the Germanic tribes, the moral and æsthetic principles of the Christian religion, its ideals of chastity, marriage and loyalty, and in particular the widespread veneration paid to the Virgin Mother of Christ, powerfully contributed to the development of the institutions of chivalry. We may be told, in answer to our claim of the peculiar regard for the female as a characteristic of the Teutonic tribes, that women were held in high esteem by the Romans. It is true that wives and mothers were treated with great regard by the Romans, and the history of no nation affords more numerous instances of female nobleness; this esteem was rendered to them, not as females, however, but as the faithful companions and patriotic mothers of citizens. It had somewhat of a political cast. But this was not the case with the Germans. There is another trait of the German character which deserves to be considered in this connection, which is very apparent in their literature, and the lives of many individuals; we mean that indefinite thirst for something superior to the realities of life, that *sehnen*, to use their own word, which hardly admits of translation, which has produced among them at the same time so much excellence and so much extravagance. These three traits of the Teutonic race, their warlike spirit, their esteem for women and their indefinable thirst for superhuman greatness, together with the influence of the feudal system and of the Roman Catholic religion, afford an explanation of the spirit of chivalry — an institution which, to many observers, appears like an isolated phenomenon in history, and leaves them in doubt whether to depise it as foolish or admire it as sublime. The feudal system divided the Christian Teutonic tribes into masses, the members of which were united, indeed, by some political ties, but had little of that intimate connection which bound men together in the communities of antiquity, and which has produced like effects in our own and a few preceding ages. They still preserved, in a great measure, the independence of barbarians. There was, however, one strong bond of union which gave consistency to the whole aggregate; we mean the Roman Catholic religion. The influence of a common religion was of great service to mankind, during the ages of turbulence and violence, in giving coherency to the links of the social chain, which were continually in danger of parting. To this cause is to be ascribed the great uniformity of character which prevailed during the ages of chivalry. The feudal system enabled the gentry to live on the labors of the peasants without the necessity of providing for their own support, and to indulge the love of adventure incident to their warlike and ambitious character. If we now combine the characteristics which we have been considering — a warlike spirit, a lofty devotion to the female sex, an undefinable thirst for glory, connected with feudal independence, elevation above the drudgery of daily toil, and a uniformity of character and purpose, inspired by the influence of a common religion — we obtain a tolerable view of the chivalric character. This character had not yet quite developed itself in the age of Charlemagne. The courage exhibited by the warriors of his age was rather the courage of individuals in bodies. The independence, the individuality of character, which distinguished the errant knight who sought far and wide for adventures to be achieved by his single arm, was the growth of a later period. The use of the war-horse, which

formed so essential an instrument of the son of chivalry, was not common among the Germans until the time of their wars with the Huns. They were, indeed, acquainted with it before, and Tacitus mentions it in his account of Germany; but it was not in common use among them till the period mentioned. After it was introduced, cavalry was considered among them, as among all nations in the early stages of their progress, much superior to infantry, which was, in fact, despised, until the successes of the Swiss demonstrated its superiority. In the 11th century knighthood had become an established and well-defined institution; but it was not till the 14th that its honors were confined exclusively to the nobility. The Crusades gave a more religious turn to the spirit of chivalry, and made the knights of all Christian nations known to each other, so that a great uniformity is thenceforward to be perceived among them throughout Europe. Then arose the religious orders of knights, the Knights of Saint John, the Templars, the Teutonic knights, etc. The whole establishment of knighthood assumed continually a more formal character, and, degenerating, like every human institution, sank at last into quixotic extravagances, or frittered away its spirit amid the forms and punctilios springing from the pride and the distinctions of the privileged orders of society.

The education of a knight was briefly as follows: The young and noble stripling, generally about his 12th year, was sent to the court of some baron or noble knight, where he spent his time chiefly in attending on the ladies and acquiring skill in the use of arms, in riding, etc. This duty of waiting about the persons of the ladies became, in the sequel, as injurious to the morals of the page as it may have been salutary in the beginning. When advancing age and experience in the use of arms had qualified the page for war, he became an *escuyer* (esquire or squire). This word is generally supposed to be derived from *escu* or *scudo* (shield, *scutum*), because among other offices it was the squire's business to carry the shield of the knight whom he served. The third and highest rank of chivalry was that of knighthood, which was not conferred before the 21st year, except in the case of distinguished birth or great achievements. The individual prepared himself by confessing, fasting, etc.; religious rites were performed; and then, after promising to be faithful, to protect ladies and orphans, never to lie or utter slander, to live in harmony with his equals, etc. (in France there were 20 vows of knighthood), he received the accolade, a slight blow on the neck with the flat of the sword from the person who dubbed him knight, who at the same time pronounced a formula to this effect: "I dub thee knight, in the name of God and St. Michael (or in the name of the Father, Son, and Holy Ghost). Be faithful, bold, and fortunate." This was often done on the eve of battle, to stimulate the new knight to deeds of valor, or after the combat, to reward signal bravery.

Chivalry exercised, in many respects, a salutary influence at a time when governments were unsettled and laws little regarded. Though it often carried the feelings of love and honor to a fanatical excess, yet the reverence paid to them contributed to prevent mankind, at this period of lawless violence, from relapsing into barbarism; and as the feudal system was unavoidable, it is well that its evils were somewhat alleviated by the spirit of chivalry. The influence which chivalry had on poetry was very great. The *troubadours* in the south of France, the *trouvères* in the north of the same country, the "minstrels" in Great Britain, the *minnesingers* in Germany, sang the achievements of the knights who received them hospitably. In Provence arose the "Courts of Love," which decided the poetical contests of the knights. At these, amorous songs (*chansons*), duets (*tensons*), pastoral songs (*pastourelles*) and poetical colloquies (*sirventes*), were performed. In Germany the chivalric spirit produced one of the most noble epics, the 'Nibelungenlied' (q.v.). It was the spirit of chivalry which led to the Crusades, and from the intercourse with the East which grew up during this period the wonders of Oriental enchantment were introduced into the romantic or chivalric poetry, and European literature received a great stimulus. Chivalric poetry, however, existed apart from any influence of this kind, and really begins with the mythological cyclus of King Arthur's round table and the feats of his knights, which furnished materials that found poetic treatment in various European countries. A second cyclus is that of Charlemagne and his paladins, his 12 peers, which remained a poetical foundation of chivalric poetry for many centuries. Alexander the Great also became a great hero of chivalric poetry. The cyclus of Amadis, which belongs, perhaps, exclusively to Spain, does not rest on any historical ground. For further information consult the essay on chivalry written by Sir Walter Scott; Heeren's 'Essay on the Influence of the Crusades'; 'Mémoires sur l'ancienne chevalerie, par Lacurne de Sainte-Palaye' (2 vols., with engravings); Gautier's 'La Chevalerie'; Henne am Rhyn's 'Geschichte des Rittertums'; Gautier, 'La Chevalerie'; and 'Don Quixote.' See also DUEL; TOURNAMENT.

CHIVASSO, kē-vas'sō, Italy, town on the Po, in the province of Turin, 14 miles northeast of the city of Turin. It was formerly strongly fortified, and contained the residence of the dukes of Montferrat. The fortifications were destroyed by the French in 1804. It markets grain and cattle. There are sulphur baths at San Genesio, two miles south. Pop. 10,084.

CHIVE, chīv, or **CIVE**, a perennial herb (*Allium schœnoprasum*), of the family *Liliaceæ*. It is a native of Europe, Asia and the northern parts of North America, but has been introduced in temperate climates as a vegetable. It has small, flat, clustered bulbs which multiply laterally to form clumps. The leaves, which grow in dense profusion, are tubular, five to eight inches long; and the flowers, which are borne in umbels, are purplish, pinkish or violet. Aside from the use of the leaves as a flavoring for soups, stews, salads, etc., the plants are frequently used for ornamental purposes, since they make excellent edgings for flower-beds. They are readily propagated by division, a process that should be performed as soon as the clumps become very dense. The plants do well in any good garden soil with no attention except weeding, and they may be clipped for use frequently during the growing season. Their flavor resembles that of onions.

CHLADNI, klăd'nē, **Ernst Florens Friedrich**, German physicist, one of the founders of the science of acoustics: b. Wittenberg, 30 Nov. 1756; d. Breslau, 4 April 1827. He adopted the profession of jurisprudence, which he practised first in his native town, and afterward at Leipzig, but his natural taste led him to study music, and to devote his leisure to physical science. The backward state of the theory of music compared with the other physical sciences early opened up to him a neglected mine of scientific discovery; and at the age of 19 he set himself resolutely to investigate it. By covering plates of glass with fine sand, and causing them to vibrate, he discovered the fundamental fact in the science of acoustics, that the communication of vibrations in material bodies is subject to constant mathematical laws. (See SOUND). His scientific investigations led him to travel through the principal countries of Europe and visit its principal capitals. He invented the euphone about 1789 and clavicylinder 1800, instruments more curious than useful, in which musical sounds are produced by friction, and by the revolution of a glass cylinder causing the vibration of chords. His scientific works are of different value. The first of them, 'Entdeckungen über die Theorie des Klanges,' appeared in 1787; 'Acoustics' (1802); 'Neue Beiträge zur Akustik' (1817); 'Ueber Feuermeteore' (1820).

CHLADNI FIGURES are figures made by sand on vibrating plates with free edges and indicating the position of the nodes. They depend in shape on the shape of the plate and the node in which it is made to vibrate. They were studied experimentally by Chladni in 1787. Consult Lord Rayleigh, 'The Theory of Sound' (London 1894-96).

CHLAMYDOPHORUS, a genus of armadillos, containing the pichiciago or truncated armadillo. It is found principally in the Argentine and Bolivia. See ARMADILLO.

CHLAMYS, klā'mis. (1) In ancient Greek costume, a light and freely flowing scarf or plaid, worn as an outer garment. It was oblong in shape, generally twice as long as its width, and was worn, according to taste or circumstances, in different ways. The chlamys of the youth was probably of a yellow color, while that of the soldier was scarlet. It was also carried by hunters and travelers, and some Romans are recorded as having adopted it. (2) In zoology, the name of a genus of coleopterous insects, belonging to the sub-tribe *Cyclica*, and the family *Chrysomelidæ*. There are but few North American species, none of large size.

CHLOASMA (Gr. *χλοασμα*, greenish), a peculiar pigmentation of the skin, of a yellowish, brownish to blackish shade, and due to a number of causes: (1) mechanical; (2) chemical; (3) thermal; (4) parasitic. Scratching is one of the most frequent mechanical causes. The irritants of mustard plasters, capsicum, cantharides,—all may cause an abnormal skin pigmentation. Sunburn is a frequent cause, a bringing out of the spots with greater vividness. Parasitic fungi have been known to cause it. In addition there are a large number of miscellaneous conditions associated with these liver spots. Pregnancy, menstruation, constipation,—one or all may emphasize their characters. Certain diseases, such as syphilis, Addison's disease (q.v.) in particular, and forms of anæmia are associated with excessive pigmentation. In only a small proportion of the cases has the liver anything to do with the condition.

CHLOPICKI, hlō-pit'skē, **Joseph**, Polish general: b. Galicia, 24 March 1772; d. Cracow, 30 Sept. 1854. He served under Kosciuszko, during the first revolt of the Poles (1794), and then engaged in Napoleon's service, under whom he took part in the battles of Eylau, Friedland, Smolensk and Moskowa. After the fall of Paris in 1814, he conducted back to Poland the débris of the Polish-French contingent, and was created general of division by the tsar. On the outbreak of the Polish revolution of 1830, he was elected dictator, but soon resigned that office, fought at Grochow and Wavre, and later retired into private life.

CHLORAL. The tri-chlor substitution-product of acetic aldehyde, obtainable from aldehyde by the action of chlorine gas. In its practical manufacture, however, it is formed by passing chlorine through cold absolute alcohol; a crystalline alcoholate of chloral is thereby formed, from which the chloral itself is afterward set free by the action of sulphuric acid. Chloral is a colorless liquid at ordinary temperatures, having the formula $CCl_3.CHO$. It freezes at about —100° F. and boils at 208° F. It combines directly with water, forming chloral hydrate (q.v.), $CCl_3.CH(OH)_2$, the substance commonly but incorrectly called "chloral."

CHLORAL HYDRATE, $CCl_3.CHO + H_2O$, a crystalline solid composed of trichloral aldehyde with one molecule of water. The crystals are single, colorless and transparent rhomboids melting at 135° F., and with an aromatic penetrating and smarting taste and slightly acrid odor. They are freely soluble in water, alcohol, turpentine, chloroform and ether. Chloral hydrate is a powerful germicide but is rarely used as such save to preserve anatomical preparations. It is a vesicant and a local analgesic. In small doses it causes burning sensations of the stomach, but little general action. Full medicinal doses, 5 to 15 grains, cause a slowing of the pulse, dilatation of the arterioles, lowering of blood pressure and slowing of the respiration. On the nervous system it acts as a depressant, causing sleep by direct action on the brain cells. Large doses cause poisoning with symptoms of collapse, coma with a feeble, thready pulse, lowering of temperature, cyanosis or lividity, cold perspiration, dilated pupils, and loss of reflexes. Death results from respiratory and cardiac paralysis. Treatment of poisoning is by rousing patient to maintain respiratory centre, artificial heat, artificial respiration, hot coffee by mouth or rectum and cardiac stimulants. Chloral is particularly valuable in insomnia from overwork and in many of the convulsive disorders, tetany, myoclonus, status epilepticus and delirium tremens. Its action is possibly due to the formation of chloroform in the general circulation, by the action of the alkalis contained in the blood, in accordance with the equation $CCl_3.CH(OH)_2 + KOH = CHCl_3 + H_2O + CHO.OK$, the last formula in this equation being that of potassium formate. It is also useful in states associated with high arterial tension, if the heart is not weakened. Within recent years a large number of allied drugs have been introduced. They have similar

actions but are more palatable or are thought to cause less heart depression. Among these may be mentioned chloralamide, chloretone, chloralose and urethane.

CHLORALAMIDE, klō-răl'a-mīd, or **CHLORAL FORMAMIDE,** fôr'ma-mīd, a substance formed by gently heating together formamide and chloral. It is usually obtained in lustrous, colorless crystals with a slightly bitter taste. It has the chemical formula $CCl_3CH < \overset{OH}{NH.CHO}$, melts at 240° F., and is soluble in 9 parts of water and in 1½ parts of alcohol. It is not decomposed by dilute acids, but is decomposed by alkalis, and also by water at temperatures above 140° F. See also CHLORAL.

CHLORALIMIDE, a substance occurring in long, colorless, needle-like crystals, with the formula $CCl_3CH:NH$. It is prepared by heating chloral and ammonium chloride until chloroform ceases to be given off. It is insoluble in water, but dissolves readily in alcohol, ether and chloroform. It is used in medicine as an antipyretic and analgesic, and must not be confounded with chloralamide (q.v.). By some physicians it is recommended as more effective than either chloral hydrate or urethane.

CHLORASTROLITE, klō-ras'trō-līt, a mineral found in the form of rounded pebbles of radiated structure on the shores of Isle Royale, Lake Superior, and derived from the trap rock in the vicinity. It is bluish-green in color, with a hardness of 5.5 and a specific gravity of 3.18. It is susceptible of a high polish. According to Hawes it is an impure variety of prehnite, but for optical reasons Lacroix classes it under thomsonite. Its name is from the Greek and signifies "green star," in allusion to its color and its stellated cross-section.

CHLORATES, the metallic salts of chloric acid. They are all more or less soluble in water, potassium chlorate being least soluble. They are all decomposed by heat, with the evolution of oxygen. See CHLORIC ACID.

CHLORIC ACID, a colorless, strongly acid liquid, having the formula $HClO_3$ and a specific gravity of 1.28. It combines with bases to produce the salts known as chlorates. Potassium chlorate is formed directly when chlorine gas is passed through a warm, concentrated solution of caustic potash. By treating this salt with sulphate of ammonia and adding barium hydrate, barium chlorate, $Ba(ClO_3)_2$, is formed, from which chloric acid is set free by the action of dilute sulphuric acid. The clear solution is decanted from the precipitated barium sulphate and evaporated over strong sulphuric acid in a vacuum, until the residue contains 40 per cent. of pure chloric acid. A further concentration leads to decomposition. This aqueous acid is colorless and has a pungent odor and a sour taste. When exposed for a time to the light it changes to perchloric acid. Chloric acid has powerful bleaching properties, owing to the facility with which it parts with its oxygen. Paper that is dipped into a strong solution of the acid takes fire spontaneously upon drying owing to the great rapidity of its oxidation. The most important salt of chloric acid is potassium chlorate, which is largely used in the preparation of oxygen gas, in the manufacture of matches, and in medicine. It crystallizes in monoclinic plates having a specific gravity of 2.35.

CHLORIC ETHER, a name given (1) to spirits of chloroform, a liquid consisting of one part of chloroform to nine of alcohol, and (2) to chloride of ethyl, C_2H_5Cl, which is obtained by passing dry hydrochloric acid gas through alcohol. The latter is a colorless, mobile liquid, having a sweet taste and a pungent ether-like smell. It has anæsthetic properties similar to those of ether. When mixed with an equal volume of alcohol it is known as "alcoholized muriatic ether."

CHLORIDES. See HYDROCHLORIC ACID.

CHLORIMETRY, the art of estimating the quantity of chlorine present in bleaching-powder or any other hypochlorite. Several methods are employed, depending for their success upon the affinity of chlorine for hydrogen. See CHEMICAL ANALYSIS.

CHLORINE, klō'rĭn, a gaseous element, discovered in 1774 by Scheele, who named it "dephlogisticated marine acid air." The term "dephlogisticated" had exactly the same import as "oxygenated," which was soon afterward introduced by Lavoisier. Davy showed that the substance is not a compound of oxygen, but a simple body or element, and from its peculiar yellowish-green color the name "chlorine" was given to it. Chlorine gas is obtained by heating a mixture of hydrochloric acid and finely powdered peroxide of manganese, and may be collected either in bottles over warm water in the pneumatic trough, or by simply leading the delivery-tube to the bottom of the collecting-bottle, and allowing the chlorine to displace the air. The reaction is

$$MnO_2 + 4HCl = 2H_2O + MnCl_2 + 2Cl.$$

Deacon's process for the commercial manufacture of chlorine consists in passing a mixture of hydrochloric acid gas and oxygen over tiles that are soaked in a copper salt preferably oxychloride of copper, and then dried and heated to a temperature of about 700° to 750° F. At this temperature the hydrochloric acid gas is decomposed with the formation of water and liberation of chlorine; the copper salt exercising an obscure influence, and being in its original form at the close of the operation. Chlorine is now largely (and perhaps chiefly) manufactured by the electrolysis of a solution of chloride of sodium (common salt).

Under ordinary atmospheric conditions chlorine is gaseous, but it condenses into a mobile yellow liquid at a pressure of about six atmospheres. It also liquefies at the ordinary atmospheric pressure at about 28° F. below zero. It has the chemical symbol Cl, and its atomic weight is usually given as approximately 35.4 for H = 1. It is two and a half times heavier than atmospheric air, and has an insupportable, suffocating odor. When pure it occasions immediate death to an animal immersed in it; but even when largely diluted with common air it cannot be respired with safety. It occasions a severe sense of stricture at the breast, which renders it impossible to make a full inspiration. Chlorine is somewhat soluble in water, the solution having the color and odor of the gas. If

the solution be cooled, long yellow crystalline needles deposit, consisting of a hydrate of chlorine. When exposed to sunlight the solution gradually loses its color, oxygen is liberated, and the water contains hydrochloric acid in solution. The great affinity of chlorine for hydrogen is one of its most characteristic properties, and is exhibited in a number of reactions. If equal volumes of hydrogen and chlorine gas be mixed in the dark and then exposed to diffused daylight, gradual combination takes place; and if the mixture be exposed to direct sunlight the gases combine at once with an explosion and produce hydrochloric acid. This is the only compound these substances form with each other, and it is one of the most important of the acids. When a lighted taper is immersed in a jar of chlorine, it burns with a smoky flame; this is due to the combination of the chlorine with the hydrogen only, and the liberation of the carbon. Similarly, when hydrocarbons like turpentine and olefiant gas are mixed with chlorine and a light applied, a ruddy flame with a copious deposition of carbon shows that the hydrogen and chlorine are alone combining. Chlorine gas is inflammable if burned in an atmosphere of hydrogen. Several of the elements catch fire when immersed in chlorine, for instance, phosphorus, arsenic, antimony, and copper; while others combine with it at a higher temperature, sometimes with vivid combustion as in the case of potassium. The binary compounds of chlorine with the other elements are termed chlorides, and next to the oxides they are the most abundant and widely distributed substances in the earth, many of them being also of great importance for manufactures. Common salt, the chloride of sodium, is the most plentiful of all, and forms large rock masses in various parts of Europe, and occurs dissolved in the waters of the ocean and of many salt lakes. In the United States rock salt is mined in Michigan, New York, Ohio, Kansas, Louisiana, Utah and California. It is the ultimate source of all the hydrochloric acid and chlorine of commerce. Other chlorides, as of potassium, calcium, etc., are met with, but in no case nearly so abundantly as common salt. As a class, the metallic chlorides are crystallizable salts, readily soluble in water, some being even deliquescent. The chloride of silver, the subchloride of mercury, and one or two others are, however, insoluble in water, while a few are decomposed by water. From its wide affinities and great activity in the free state, chlorine is one of the most useful and powerful instruments with which the chemist deals. By it such metals as platinum and gold are attached and made soluble in water, while its power over organic substances is very great, and has resulted in the formation not only of a number of compounds by simple union with it, but of a great number into which the chlorine has entered more intimately and produced what are called substitution compounds.

Chlorine is largely consumed in the arts. Thus it is used in the manufacture of potassic chlorate, in the conversion of the yellow to the red prussiate of potash, in the preparation of chloride of sulphur for vulcanizing, and above all as a bleaching and disinfecting agent. This last property is exercised by chlorine by virtue of its power of decomposing water by combining with the hydrogen and liberating oxygen, which latter substance is the true agent in the operation, and which converts the coloring matter into colorless compounds. Berthollet was the first to apply chlorine to the process of bleaching. The method of using it has been successively improved. It consisted at first in subjecting the thread or cloth to be bleached to the action of the gas itself; but the effect in this way was unequally produced, and the texture was sometimes injured. It was then applied in a dilute aqueous solution. The thread or cloth was prepared as in the old method of bleaching, by boiling first in water and then in alkaline lye; it was then immersed in the diluted chlorine, and this alternate application of alkali and chlorine was continued until the color was discharged. The offensive suffocating odor of the gas rendered this mode of using it, however, scarcely practicable; but the odor was found to be removed by a weak solution of potash; lime immersed in water, being more economical, was afterward substituted. Later a compound of chlorine and lime was employed, prepared by exposing slaked lye to chlorine gas; the gas is quickly absorbed by the lime, forming a compound of the hypochlorite and the chloride of lime, or bleaching-powder, as it is called, and this, being dissolved in water, forms the bleaching-liquor now generally employed. (See BLEACHING MATERIALS). In using it the cloth is first commonly steeped in warm water to clean it, and is then repeatedly washed with an alkaline solution so diluted that it cannot injure the texture of the cloth; the cloth is then washed and steeped in a very weak solution of the bleaching-powder, again washed, acted on by a boiling lye as before, and again steeped in the solution; and these operations are performed alternately several times. The cloth is lastly immersed in very dilute acid, which reacts on the bleaching-powder and liberates chlorine; this then attacks the coloring matter, and the cloth soon acquires a pure white color. It is next repeatedly washed with water to remove the last traces of the lime salts, and then it is exposed to the action of a hyposulphite in order to render inoperative any chlorine that may remain. (See ANTICHLOR). The cloth is finally washed, dried, and dressed. When sulphuric acid is used to liberate the chlorine it is found more difficult, in the subsequent washing, to remove the calcic sulphate formed, on account of its sparing solubility in water. To avoid this, chloride of magnesia has been substituted for the chloride of lime. It is easily prepared by adding sulphate of magnesium to a solution of chloride of lime and straining off the clear fluid. It has the same bleaching power, is easily removed by washing, and is said to leave the cloth in a more supple state than when ordinary bleaching-solution has been employed. Another important application of chlorine gas and of bleaching-powder is to the destruction of disease germs. Acid vapors, sulphurous acid in particular, under the form of the fumes of burning sulphur, are often employed for that purpose; but chlorine is superior to any other agent, and is now widely employed for the purposes of fumigation and disinfection.

In medicine, chlorine gas dissolved in water is used extensively for bactericidal purposes. It is employed as a mouth-wash and for bathing purposes, being both a deodorant and a bactericide; and internally has been used for its

germicidal properties, particularly in typhoid fever. See CHEMISTRY, PROGRESS OF.

CHLORIS, klō'ris (Gr. *χλωρός*, pale green as seen in flowers). (1) The Greek goddess of flowers and the wife of Zephyrus, identical with the Flora of the Romans. (2) The daughter of the Orchomenian Amphion, the wife of Neleus and the mother of Nestor. (3) The daughter of the Theban Amphion and of Niobe. When the children of Niobe were killed she alone escaped along with Amyclas, and became so pale from terror that her former name of Melibœa was exchanged for that of Chloris.

CHLORIS, a greenish-yellow bird, about the size of a lark, mentioned by Aristotle. It is said to have been yellow underneath and, by some, has been identified with the yellow wagtail. The name was applied generically and specifically to the European greenfinch, which is now generally called *Ligurinus chloris*. The word is also used to designate a genus of warblers.

CHLORIS, or **PRAIRIE CHLORIS** (*Chloris verticillata*), a genus of grasses, of which there are some 60 or more species, mostly natives of warm, dry countries. About 10 of these species are found on the prairies, from Kansas to Texas. *Chloris radiata* is a pretty annual grass frequently cultivated in greenhouses for the sake of its ornamental and curious appearance.

CHLORITE (L. *chloritis*, stone) **GROUP**, in mineralogy, a group of minerals crystallizing in the monoclinic system, exhibiting a green color from the presence of ferrous iron and chemically definable as hydrous silicates of aluminum, ferrous iron and magnesium. They are usually secondary minerals, derived from pyroxene, amphibole and other forms. They exhibit a marked basal cleavage suggestive of mica; but they differ from mica and its allies by not containing any considerable amounts of calcium or of the alkalis.

CHLORITE SCHIST, shīst. As chlorite is a general name for green, secondary, hydrated silicates, containing alumina and iron, derived particularly from augite, hornblende and biotite, so chlorite is used as a prefix to various names of rocks that contain such silicates, for example, chlorite schist. In the wide belt of Algonkian and Archæan rocks stretching from Labrador to the west end of Lake Superior are great areas of chlorite schists resulting from the alteration of sedimentary as well as igneous rocks.

CHLORODYNE, klō'rō-dīn or -dēn, a proprietary mixture of uncertain composition and best represented by the National Formulary formula, which is a mixture of chloroform, cannabis indica, morphine and tincture of capsicum. Practically all of the chlorodynes on the market contain morphine, and hence are dangerous poisons. Their sale should not be permitted save on a physician's prescription.

CHLOROFORM ($CHCl_3$, trichloromethane, methenyl chloride, terchloride of formyl), a heavy, clear, colorless, mobile and diffusible liquid of a sweet burning taste and characteristic etheral odor formed by the action of the sun's rays on a mixture of chlorine and marsh gas; also by the action of caustic potash on chloral or chloracetic acid, or by the action of nascent hydrogen on tetrachloride of carbon. It is prepared on a large scale by distilling water and alcohol with bleaching-powder (chloride of lime). Slaked lime is sometimes added. Its vapor density is four times that of air. Its specific gravity should not be below 1.49, and it should be soluble in 200 volumes of cold water, and in all proportions in alcohol, ether, benzol, benzine and fixed and volatile oils. It is volatile, even at low temperature, boils at 140° F. and freezes at —115° F. It should not be exposed to the light, as it is liable to decomposition with the liberation of hydrochloric acid and chlorine.

As used in medicine it is a liquid consisting of 99 to 99.4 per cent by weight of absolute chloroform and 1 to 0.6 per cent of alcohol. It is not inflammable, but its vapor burns with a greenish smoky flame. It is an excellent solvent for a variety of substances, as caoutchouc, resins, fats, sulphur and phosphorus, many alkaloids and other organic substances. It is antiseptic and prevents the growth of deleterious micro-organisms, but has no effect upon yeast. Medicinally it is used as an aqua, emulsion, liniment, spiritus and pure U. S. P. chloroform. Its physiological action is allied to the alcohols, but it is much more energetic. Externally chloroform is an irritant, and if confined on the skin it can cause blistering. It is irritant to mucous membranes, and, taken into the stomach, causes a sense of warmth and burning with increased production of gastric secretions. In large doses it causes violent gastro-enteritis.

Its chief use in medicine is as a general anæsthetic, for which purpose it was first used by Simpson, of Edinburgh, in 1848. As an anæsthetic its vapor is inhaled; it thus enters the circulation through the blood circulating in the lungs. When so administered the stages of anæsthesia closely resemble those induced by others of the alcohol series, but in chloroform the anæsthesia is very rapid. There is first a stage of excitement, with heightened cerebral activities. This is soon followed by a gradual dissolution of the mental faculties, usually in an order the reverse of their complexity. Thus the highest faculties of judgment, memory, etc., are attacked first, then unconsciousness gradually sets in. The spinal cord centres are then affected; there may be some temporary irritation, which is followed by paralysis, and then by loss of sensation and of the reflexes. The automatic centres of breathing and the heartbeat are only slightly affected. There may be some lessening of the heart action, following an initial stimulation, and similar respiratory changes. The patient thus in complete anæsthesia is motionless and senseless, unable to feel or move, his automatic functions of most vital importance to life-maintenance alone functionating. It is in this stage that operations are performed, although minor operations may be performed in the early stages of primary anæsthesia.

When the administration of chloroform is pushed too far, or there is a peculiar susceptibility to its effects, as in some individuals, poisoning results. It is usually rapid in onset, is attended with cyanosis, weak, trembling pulse and reduction of blood pressure. The vasomotor system seems to be paralyzed and death is due perhaps to this alone, although other factors seem to be involved at times. Following

chloroform anæsthesia, nausea and vomiting are apt to occur. Chloroform is a safe anæsthetic, deaths to the proportion of 1:3000 or 1:4000 are said to occur; but ether, which has a proportion of 1:16,000 is preferred by many. This is so particularly in America, whereas in Europe chloroform is preferred. See ANÆSTHETICS; ETHER.

CHLOROPHANE, in mineralogy, a variety of fluorspar, or fluorite, which when warmed, shines with a green phosphorescent light. Fine specimens are found at Trumbull, Conn., and in the mica mines of Amelia County, Va.

CHLOROPHY'CEÆ (Gr. *χλωρός*, light green, and *φῦκός*, seaweed). A group of Algæ which is characterized by the fact that the green chlorophyll (q.v.) of its members is not masked by other pigments. Certain Algæ of a yellowish green color which were formerly considered to belong to this group have been assigned by Luther and many other systematists who follow him to a new class, the Heterokontae. These are not only characterized by the possession of great quantities of the yellow pigment xanthophyll, but also by the fact that they store up part of the products of their metabolism in the form of oil, whereas it is all transformed to starch in the true Chlorophyceæ.

The Chlorophyceæ show a remarkable diversity in form and structure. They range all the way from the unicellular *Chlamydomonas* and the other cilate free-swimming *Volvocaceæ*, which exhibit close affinities to the lowest forms of animal life, the Flagellate Protozoa, to the fixed many-celled filaments of *Spirogyra*, or the enormous complicated multinucleate cell of the *Siphoneæ*. This latter structure is unique in the vegetable world; in *Caulerpa*, for example, we have what is apparently a plant fully endowed with roots, stem and leaves and several inches in length, while all that really is there is a mass of protoplasm containing many nuclei and surrounded by a single cell-wall. This structure, of course, represents not a single true cell but a mass of cells whose inner walls are undeveloped, as is evidenced by the occurrence among the Chlorophyceæ of forms in which the disappearance of these cell-walls or septa is only partial.

Asexual reproduction by motile spores or zoogonidia is found in most Chlorophyceæ, although the *Conjugatæ* never propagate themselves in this manner. Non-motile asexual spores are often found. In many of the unicellular forms, the normal mode of reproduction is by cell division.

Sexual reproduction is found in the most varied forms. The cells which unite may be equal or unequal in size, and either motile or non-motile. In the case of *Spirogyra*, sexual union takes place between two ordinary vegetative cells in place in their filaments. In a few instances, traces are found of an alternation between sexual and asexual generations.

The cells of the Chlorophycean are all nucleate, and in almost all cases contain chloroplasts (q.v.) with pyrenoids, or masses of reserve protein. The cell-wall, though usually made up of cellulose, often exhibits the mucilaginous pectose, to which much of the slimy character of the algæ in pond-scum is due.

The habitat of most Chlorophyceæ is fresh water, and most fresh-water algæ belong to the class. The majority of the Siphoneæ, however, and several other species of the green algæ are marine. Consult Lemmerman, E., 'Flagellatæ, Chlorophyceæ, Coccosphaerales and Silicoflagellatæ' (Kiel 1908); West, G. S., 'A Treatise on the British Fresh-Water Algæ' (Cambridge, Eng. 1904).

CHLOROPHYLL (Gk. *χλωρός*, light green, and *φύλλον*, leaf). The green coloring-matter possessed by almost all plants that are not of a parasitic or saprophytic habit. It is soluble in ether, alcohol, chloroform, carbon disulfid, olive oil, benzine and other organic solvents, and when dissolved exhibits a red fluorescence and a very characteristic absorption-spectrum. Willstätter has pointed out that there are four pigments in green leaves, all of which used to go under the name of chlorophyll. These are chlorophyll *a*, blue-black in the solid state and green-blue in solution, of the formula $C_{55}H_{72}O_5N_4Mg$; chlorophyll *b*, $C_{55}H_{70}O_6N_4Mg$, green-black in the solid state and pure green in solution; the orange-red carotin, $C_{40}H_{56}$; and the yellow xanthophyll, $C_{40}H_{56}O_2$. All of these he has isolated in a pure state. There is good evidence that these substances are not mere artefacts of the isolation-process, but exist as such in the living cell. In the first place, the transmission spectra of these substances exhibit the lines shown by that of the living leaf. In the second place, that curious phenomenon of the chlorophyll in the leaf, that it cannot be extracted by solvents free from water, has also been exhibited by Willstätter in colloidal solutions of the extracted chlorophyll, and is consequently no evidence of the hydrolysis of chlorophyll during its extraction.

The chlorophyll obtained from different plants has been shown to be always made up of the same constituents in much the same proportions. Other pigments besides the chlorophyll-constituents, however, are to be found in the cells of many plants, in very close association with the chlorophyll-constituents proper. These are especially to be found in the brown, the red and the blue-green algæ.

The function of chlorophyll in the plant is to take part in the photosynthesis of carbohydrates from carbon dioxide and water, but no experiment as yet undertaken has exhibited this action on the part of chlorophyll *in vitro*. The action of chlorophyll is bound up with the entire structure of the chloroplasts (q.v.), or chlorophyll bearing bodies in the cells of the plant. It has been found that the photosynthetic activity of plants is not simply proportional to their chlorophyll-content, and for this and other reasons Willstätter has been led to postulate an enzyme in the plant cell, which acts together with chlorophyll in the production of carbohydrates, so that the rate of carbohydrate generation is a function of two independent variables, if not of more.

The systematization of the chemistry of chlorophyll is due to Willstätter, although in many important points his work was anticipated by the British physicist G. G. Stokes in the sixties of the last century. Both Stokes and Willstätter made use of the method of separating two substances that depends on their unequal solubilities in different solvents. With the pure materials that he has obtained in this way, Willstätter has made a number of highly interesting

experiments. For example, he has produced a number of substances in which the magnesium of chlorophyll is replaced by other metals. Consult Jörgensen, I., and Stiles, W., 'Carbon Assimilation' (in *New Phytologist*, 1915).

CHLOROPHYLLITE, klō-rō-fil'īt, an alteration product of the mineral iolite. The only difference in composition is a larger percentage of water, but there is a marked decrease in hardness, from 7 to from 1.5 to 3, and also in transparency. The characteristic blue color of iolite is changed to a dull green, while a basal cleavage is highly developed. Its specific gravity is 2.7. It is found at Unity, N. H.

CHLOROPLAST (Gk. χλωρός, light green, and πλαστός, formed). The chlorophyll (q.v.) or green coloring-matter of plant-cells is not diffused throughout their mass, but is collected in certain special bodies known as *chloroplasts*. These chloroplasts may be of the most varied shapes; they may be granular, as is the case in most flowering plants, or spiral bands, as in *Spirogyra*, or flat plates, as in *Mesocarpus*. They contain particles of nutritive material in the form of starch-grains, oil-drops, and highly-refractive masses of proteid known as *pyrenoids*.

Bodies of the same general character as chloroplasts, but differing from them in the absence of chlorophyll, are known as *leucoplasts* or *chromoplasts* according as they are colorless or pigmented. Chloroplasts, leucoplasts and chromoplasts are all known as *chromatophores*. In all embryonal cells, all the chromatophores have the appearance of leucoplasts, being small, transparent, highly-refractive bodies of granular, spindle-like, or thread-like form. It is because of this common origin that the chromatophores, or as they are also called, *plastids;* are classed together under a single heading.

In those phanerogams that lack a green color, the chloroplasts are replaced by other chromatophores. In the fungi, however, which likewise lack chlorophyll, there are no chromatophores of any sort. The chromatophores of the blue-greed, red and brown algæ contain chlorophyll, but in addition other pigments, known as phycocyan in the blue-green algæ, phycoerythrin in the red algæ, and fucoxanthin in the brown algæ.

The chloroplast, as the chlorophyll-bearing organ, is undoubtedly that part of the cell which is most directly concerned in the assimilation of carbon dioxide. This process is very imperfectly understood, but is believed to involve the action of an enzyme. (See CHLOROPHYLL).

Ponomarew claims that the chloroplast is liquid, and of a colloidal nature. He explains its relative permanency of shape by supposing that it is in equilibrium with the surrounding cell-contents as to surface-tension. He accounts for the contraction of the chloroplast into a spherical shape when the cell is treated with dilute alcohol as due to a disturbance of this equilibrium.

In most plants the chloroplasts are sensitive to light, and place themselves in the cell in such a manner as to offer the greatest surface possible to a slight illumination, but the least surface possible to an intense illumination. Thus the plate-like chloroplast of *Mesocarpus* presents its face to a weak light, its edge to a strong one. The chloroplasts of *Lemna trisulca* group themselves in planes parallel to the surface of the leaf when moderately illuminated, but perpendicular thereto if the illumination be intense. In all cases the position in the dark is less definitely determined. On account of these light-reactions of the chloroplasts, the suggestion has been made that they act in a manner analogous to sense-organs, but this idea of a specific sensitivity on their part has been opposed by Pfeffer.

CHLOROSIS (Gr. χλωρός, green), is a diseased condition which first manifests itself almost exclusively in females at the time of puberty or in the early years after its establishment. If it occurs later it is probably the recurrence of an earlier attack. The manifest symptoms are a characteristic pallor which often shows a greenish-yellow tint and gives the disease its name, chlorosis or "green-sickness"; lassitude, tendency to fatigue, to headache and vertigo; loss of appetite and anomalies of appetite, digestive disturbance; sometimes dilatation of the heart and anæmic heart murmurs; dyspnœa; slight rise in temperature; disturbance of the menstrual function and other hysterical manifestations. The red corpuscles of the blood are but slightly reduced but there is insufficiency of hæmoglobin. There is evidence to show that the hæmoglobin is not reduced but diluted by the marked increase in blood plasma.

The disease has come to be recognized as due to a disturbance of the secretory function of the sexual glands. As such it is variously explained. It has been thought that there is a deficiency of the hormone substances secreted by the ovary into the general circulation and therefore an interference with blood formation and likewise with the formation of the bone marrow. But the alteration of the blood is not always present in chlorosis nor is there evidence of insufficiency of the bone marrow. These features separate chlorosis from anæmia as does also its different response to iron. Another theory is that of intoxication produced in the blood through disturbance of the ovarian activity. When ovulation first takes place at puberty and at each subsequent menstruation there is a new formation of interstitial cells in the ovarian (Graafian) follicles and an accumulation of lipoids produced by these cells, upon which sexual characteristics depend. Anything which disturbs the normal relativity between the number of lipoids produced and the number utilized in the process of maturation produces an increase of these in the ovary and in the blood, with resulting intoxication of the organism. This produces the symptoms of chlorosis, the insufficiency of hæmoglobin, cardiac, vasomotor, respiratory and other disturbances already noted. The follicular disturbance affects directly the menstrual function, causing amennorhea, and the uterine issue. The action of iron has been found to be inhibitory to the ovarian lipoid secretion, hence its value, according to this theory of chlorosis, in this disease.

The presence frequently of hysterical symptoms as well as response to certain environmental elements in treatment point to a psychical etiology also for chlorosis. That portion of the nervous system which controls the activity of the endocrinous glands (glands of inner secretion) is no less than the voluntary nervous centres at the service of the psychical

attempt to adapt to environment the attitude of the patient toward the world. The disease occurs at the period when psychical and physical activity are stimulated to new adjustments which are made often with much difficulty. Stimulation and inhibition of psychical impulses are not well adjusted. The chlorosis, therefore, is one mode of expression of inability to adapt individual wishes to the demands of development in the social environment, which at this period of stress comes to definite expression and may manifest itself again at further strenuous periods. Psychotherapy should therefore also be considered in treatment. Consult Falta, 'The Ductless Glandular Diseases'; Pende, 'Endocrinologia'; Jelliffe and White, 'Diseases of the Nervous System' (2 vols., ed. 1917).

SMITH ELY JELLIFFE.

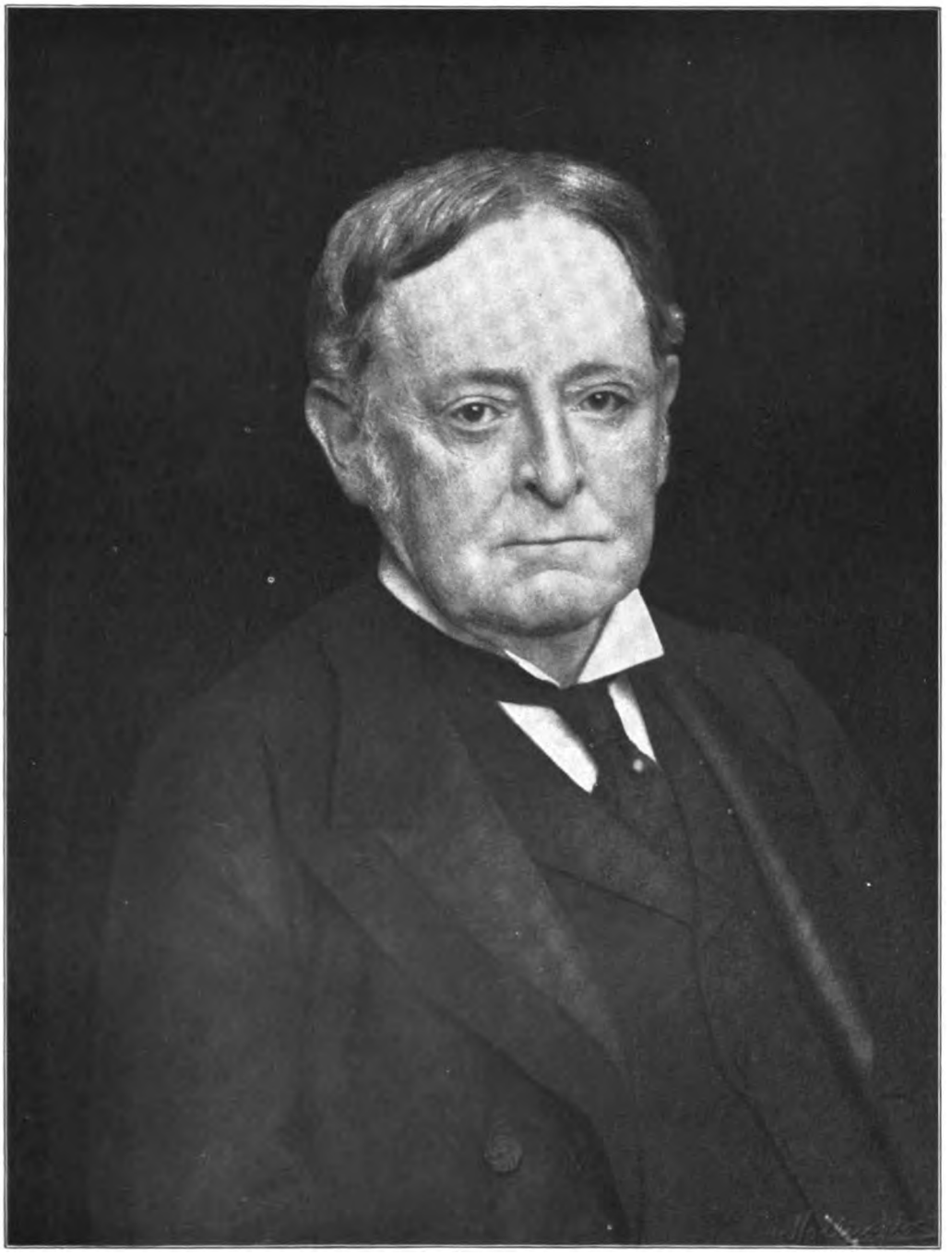
CHLOROXYLON (Greek, χλωρός, green, and ξύλον, wood), a genus of plants of the order *Meliaceæ*, distinguished by the fact that the fruit has only three cells and is split into three parts. The satinwood tree of India, *Chloroxylon swietenia*, sometimes grows to a height of 50 or 60 feet and is a native of Ceylon and the Coromandel coast. The wood is hard and light-colored, having a satin-like lustre and is sometimes mottled or curled, somewhat resembling boxwood but deeper in color. It is mainly used for articles of turnery, for the backs of brushes and often as veneering for cabinet-work. The tree also produces a gum, a wood oil and an ethereal oil from the leaves.

CHMELNIZKIJ, kmĕl-nit'skē, Nikaloi Ivanovich, Russian writer: b. 1789; d. 1846. He contributed largely to the reformation and elevation of the Russian stage. Among his comedies are 'The Babblers'; 'Air Castles'; 'The Waverer.'

CHMIELNICKI, kmy-ĕl-nĭt'skē, Bogdan, Cossack chief: b. 1593; d. 25 Aug. 1657. He was the son of a Polish nobleman, who settled among the Cossacks of the Ukraine. This people, who had long defended the eastern boundaries of Poland against the Tartars and Russians, were at that time subjected to grievous oppression. Their religion was persecuted, their freedom circumscribed and the castle of Kudak, called the curb of the Cossacks, was built to restrain them. Thus exasperated, they seized Kudak and massacred the garrison, but were soon subdued. After their defeat at Kumejki, Bogdan was sent to the Polish court, where he was favorably received, but suspicion soon drove him forth and finally made him a scourge of Poland. Availing himself of the hatred and prejudices of the Cossacks, he entered upon a conspiracy against the Poles, and sought the alliance of the khan of the Tartars. Chmielnicki became master of the Ukraine and carried terror, devastation and death as far as Lemberg and Zamosc. Under the new king, John Casimir, the war was continued with equal ferocity on both sides until Chmielnicki was checked. He sought the protection of Turkey, of Russia (1654), and again that of Poland (1656), and finally lived in retirement under the suzerainty of the Tsar of Russia. An equestrian statue commemorating Chmielnicki was erected at Kiev in 1873.

CHOATE, Joseph Hodges, American lawyer and diplomat: b. Salem, Mass., 24 Jan. 1832; d. New York, 14 May 1917. He was graduated at Harvard University in 1852 and at the Harvard Law School two years later. After practising law in Boston for a year he went to New York city, where he achieved remarkable success as a lawyer. In 1856 he became active as a republican in supporting John C. Fremont. In 1884 he became a member of the famous legal firm of Evarts, Choate and Beaman. He won great distinction as a trial lawyer, conducting many celebrated cases in State and Federal courts and International tribunals. He successfully defended Gen. Fitz John Porter, prosecuted the infamous Tweed Ring, appeared in the Tilden will contest, the Chinese Exclusion cases, the Income Tax cases of 1894, etc. In 1894 he was president of the New York State Constitutional Convention. In 1897 he was a candidate for the United States Senate, but was defeated by T. C. Platt. President McKinley appointed him in 1899 to succeed John Hay as ambassador to the court of Saint James, in which capacity he served with distinction till 1905. He was elected Hon. Bencher of the Middle Temple of England on 10 April 1905. In 1907 he served as ambassador and leading delegate of the United States to the International Peace Conference at The Hague, and his activity as a public-spirited citizen was manifested as a trustee of the Metropolitan Museum of Art and of the American Museum of Natural History, a governor of the New York Hospital (1877–1917) and in many other ways. Among his published writings are 'Addresses on Abraham Lincoln, Admiral Farragut, Rufus Choate, The Supreme Court of the United States,' etc., and 'The Two Hague Conferences.'

CHOATE, Rufus, American lawyer: b. Ipswich, Mass., 1 Oct. 1799; d. Halifax, N. S., 13 July 1859. He as a child showed remarkable precocity; was graduated at Dartmouth College in 1819; was admitted to the bar and began practice in Danvers in 1823; removed to Salem in 1828; and was a member of Congress in 1830–34, resigning in the latter year. Removing to Boston in 1834, he rapidly acquired a large practice. He was successor of Daniel Webster in the United States Senate in 1841–45; resuming his legal practice in Boston at the expiration of his senatorial term. He traveled in Europe in 1850 and was a delegate to the Whig National Convention in Baltimore in 1852. After Webster's death Mr. Choate was acknowledged the leader of the Massachusetts bar. He made many political speeches, the most brilliant, while a United States senator, including those on the Oregon Boundary, the Tariff, the Fiscal Bank Bill, the Smithsonian Institution and the Annexation of Texas. His style is peculiar and characteristic, but hardly to be commended as a model for imitation; it is rich, vivid and glowing, instinct with passion and colored with all the hues of fancy, but sometimes, it must be admitted, a little extravagant and exaggerated. The most remarkable feature, however, in his written compositions, is the structure of his periods. These are not the short and compact statements, involving but a single proposition, in which most writers of our times express their thoughts; but they recall and renew the continuous sweep and long-resounding march of the prose writers of the



JOSEPH HODGES CHOATE

16th century. They are often of breathless length, containing clause after clause, modifying, enlarging or limiting the leading idea. His 'Addresses and Orations' appeared in a sixth edition in 1891. Consult Brown, 'Life of Rufus Choate' (1870); Neilson, 'Memories of Rufus Choate' (1884); Whipple, 'Recollections of Eminent Men' (1886).

CHOBI, chō'bę, a Bantu people in southeastern Africa, extending from the Limpopo to the sea. On the coast they are called Mindongas. They scarify their faces.

CHOCK, a piece of wood employed on shipboard as a wedge to support various articles liable to be displaced by the motion of the vessel. It receives different names according to the purpose for which it is used, as "anchor-chocks" to support the anchor; "rudder-chocks" to keep the rudder immovable in the event of accident rendering it unmanageable. Chocks are also used to support casks, boats and other curved objects. It is probably analogous to shock in derivation.

CHOCOLATE. See Cocoa.

CHOCTAW (properly **CHAHTA**, the chief "Chactas" in Chateaubriand's 'Atala' is an eponym of the tribe), one of the largest tribes of the great Muskhogean (q.v.) stock and before its deportation the most advanced in husbandry and general culture of any except the Creeks. They were called "Flatheads" by the French (not to be confused with the northwestern tribe of that name), from a habit of flattening their children's skulls with bags of sand; and they had a burial custom of disinterring the corpses after a few days, cleaning the bones and preserving them. They are rather short, stout and slow, compared to the taller and more active Chickasaw (q.v.); and were nicknamed "tubbies," though not on that ground, but from the customary final word of their war-chiefs' names, meaning "killer." The Chickasaw was one of their subdivisions, or perhaps merely the more warlike and adventurous portion, till after the whole had crossed the Mississippi; and while using a dialectic language of their own for common service, still employed Choctaw for oratory. The Choctaw occupied central and southern Mississippi and western Alabama in three divisions, west of the Muskhogee; and in the 18th century their chief towns lay in two groups, one some 200 miles north of New Orleans (about the present Choctaw County, Miss.) and the other about half way from the Chickasaw to Mobile. These villages a century earlier had been numerous and widely distributed; they are stated at 40, and the tribe as having 2,500 warriors. It was first found by De Soto in his expedition of 1540. At their town of Mavila (Mobile probably, Choctaw Bluff, Clarke County, Ala., on the north bank of the Alabama), was fought perhaps the bloodiest and most destructive single battle ever known between red and white men on the continent. The village was burned, 20 of De Soto's men killed and 150 wounded and many hundreds of Indians slain — the Spanish chroniclers say 2,500 to 3,000, which may be discounted. Tristan de Luna met them again in 1560. The French, in settling this region about 1700, came immediately in contact with them, and established friendly relations with them, contrasting strongly with the permanent hostility of the Chickasaw, against whom and the Natchez the Choctaw aided the French. The latter planted forts in their country and sent missionaries among them. In the final struggle between France and England, however, the English won over a part of them, including the chief Red Shoes. After the Revolution the Choctaw shared with the other Indians in the general treaty of Hopewell, 28 Nov. 1785, by which the sovereignty of the United States was recognized, a portion of the Choctaw lands ceded and they were "guaranteed" the possession of the rest. By 1800 some 500 of them had migrated to the Arkansas (Indian Territory) and it is said that the rest were much less unwilling to go than the Cherokees and Creeks. They did good service to the Americans in the Creek War 1813–14. In 1820, by the Treaty of Doak's Stand, they ceded part of their lands for an equivalent amount on the Arkansas; and in 1830, by that of Dancing Rabbit Creek, they gave up the rest — 19,000,000 acres, or nearly 30,000 square miles, in the two cessions, for 20,000,000 acres in Indian Territory and $2,225,000 in money and goods. In 1837 they removed with the Chickasaw to their new lands, between the Arkansas and Canadian rivers on the north and the Red River on the south. How the Chickasaw first amalgamated with and then separated from them is told under Chickasaw. They made good progress, received the missionaries of the American board and several Church denominations, were given a well-devised school system and established a government consisting of a head chief, a council of 40 chiefs, a two-chambered legislature and a regular judiciary system, with trial by jury. Like all the southern tribes, they were slaveholders and in 1860 had some 5,000 negro slaves. Their superintendent and agents were Southerners, and they joined the Confederate side in the Civil War. Though their land was not overrun, their progress was brought to a standstill and their population reduced by a third; and after the war, they were for a time deprived of their rights. On being restored, they had to part with a section of their lands to the government, which settled other tribes there. For a time, a territorial government was formed, with the superintendent as governor; and they had to make heavy allowances to their emancipated slaves. A grammar of their difficult language was published in 1870. In 1915 there were 25,168 Choctaws proper in the Territory, besides those who had taken up lands in severalty; and 1,660 still remaining in Mississippi.

The lands located in the Choctaw Nation comprise 6,953,048 acres, which under treaties with the United States government, owing to their close affiliation with the Chickasaw Nation owning an additional 4,707,903 acres, total 11,660,951 acres, are held in common by the members of both of these tribes of Indians. See Chickasaw; Indian Affairs.

CHOCZIM, hō'tsim (properly **KHOTIN**), Russia, fortified town, on the right bank of the Dniester, opposite to Kaminiec, in Bessarabia, a few miles from the Austro-Hungarian frontier. In 1718 the Turks caused it to be regularly fortified by French engineers; but it was taken by the Russians in 1730, 1769 and 1788. As it is completely commanded by the hills which surround it, its value as a fortress is now small. Its chief importance is as a mili-

tary station. The inhabitants are engaged chiefly in agriculture. Here John Sobieski defeated the Turks in 1673. Pop. 19,561.

CHODAT, shō-dä, **Robert,** Swiss botanist: b. Moutier-Grandval, Jura-Bernois, 6 April 1865. In 1889 he became a professor of botany in Geneva University and was *doyen* of the Faculté des Sciences there, from 1898 to 1906, and rector of the university from 1908 to 1910. He has contributed numerous professional papers to botanical journals, and has published many important monographs, including 'Principes de botanique' (1906); 'Sur le polymorphisme des Algues' (1908); 'Les Ptéridopsides des temps paléozoïques.'

CHODKIEWICZ, Hōd-kē-ā'vich, **Jan Karol,** Polish general: b. Lithuania 1560; d. Chocim, 27 Sept. 1621. He served in the Spanish army under the duke of Alva and also under Maurice of Nassau. Later he returned to Poland and took part in crushing the Cossack revolt and the campaigns against Wallachia. In 1602 he went to Livonia as commander of the Polish army and three years later he inflicted a crushing defeat on Charles IX of Sweden at the battle of Kirchholm. He made an unsuccessful campaign against Russia, and he drove back the Turks who had an army of nearly 200,000 trained men (1620–21).

CHODOWIECKI, Hō-dō-vy-ĕts'kē, **Daniel Nicolaus,** German designer and engraver: b. Dantzic, 16 Oct. 1726; d. Berlin, 7 Feb. 1801. He was instructed in miniature painting by his father, and subsequently painted snuff boxes. He was encouraged to study enameling, and soon attracted attention by the beauty and finish of his productions, some of which came under the notice of the academy of Berlin, and procured him a commission to make a set of designs for their almanac. The manner in which he executed these established his reputation. He thenceforth devoted himself almost exclusively to designing and engraving; he produced the plates for Klopstock's 'Messiah,' 'Don Quixote,' Lavater's 'Physiognomy,' editions of Shakespeare, Voltaire, La Fontaine and many other works.

CHODZKO, kōdz'kō, **Jacob Leonard,** Polish scholar: b. Oborek, 6 Nov. 1800; d. 1871. Having traveled as secretary of Prince Oginski through nearly all Europe, he established himself in 1826 at Paris, where he published a memoir of the prince, with an introduction entitled 'Observations sur la Pologne et les Polonais' (Paris 1827), and commenced collecting materials for a history of his country from the death of Augustus III. Afterward he published the 'History of the Polish Legions in Italy, Under the Command of General Dombrowski' (1829). During the revolution of July 1830, Lafayette appointed him his aide-de-camp; and after the outbreak of 29 November of the same year in Warsaw, he acted as agent of the revolutionary government in France. He was an active member of the French-Polish and American-Polish committees, and after the failure of the revolution, as member of the national Polish committee of France.

CHŒNIX, kē'nĭks, a measure of capacity among the ancient Greeks. Its size is variously given, and it is probable that it actually differed in the different states of Greece. Some accounts represent it as containing three cotylæ, or about 1.487 pints English; others make it equal to 1.982 pints; and still others give it as equal to 3.964 pints. This variety is due to the fact that it was originally the daily ration of a man. Recent discoveries would seem to indicate that the chœnix was about 1.5 liters.

CHŒRILUS, kē'rĭ-lŭs, the name of several Greek poets, among whom Chœrilus of Samos is the best known. He lived in the 5th century B.C., was the contemporary and friend of Herodotus, and composed an epic poem, entitled 'Perseis,' celebrating the victory of the Greeks over Xerxes. The fragments of the poem still extant have been collected and explained by Näke (Leipzig 1817). Another Chœrilus, of Iasus, in Caria, is mentioned by Horace as an example of an extremely bad poet. He formed part of the train of literary men who were selected to accompany Alexander the Great on his expedition to the East.

CHOIR. *In religious worship,* an organized body of singers. In ceremonial Christian religions, the choir officials and choristers, or other singers taken collectively, are spoken of as the choir. Typical choral organizations, such as those of Catholic and Episcopal cathedrals and churches are usually divided into two sets of voices, the one sitting on the north and the other on the south side of the chancel, and are known by the respective titles of Cantoris and Decani from their nearness to the Cantor (or Precentor) and to the Decanus (or Dean). In most cathedrals and collegiate chapels, the Decani side is held to be the side of honor, the best voices are placed there, and all the verses or soli parts, if not otherwise directed, are sung by that side, which is also considered the "first choir" (coro primo) in eighth-part music.

In architecture, the eastern limb of a cruciform church or the eastern portion of any church. In the latter case it is more commonly styled the chancel (q.v.), and is frequently constructionally lower and narrower than the main part of the building. The ordinary daily services in a cathedral or collegiate church are held in the choir. While architecturally the term choir is applied to the entire portion of the church east of the crossing, the eastern limb is itself divided into three portions: (a) the "ritual choir," containing the stalls for the singers and comprising the western portion of the architectural choir; (b) the presbytery, next east of this, containing seats for the laity (a term sometimes applied to all of the choir east of the "ritual choir"); (c) the sanctuary, containing the altar and sedilia, and divided from the remainder by a low railing. In certain cases there is even a fourth division called the rectro-choir, comprising one or more bays east of the sanctuary. It should be noted that the "ritual choir," or place for the singers, does not invariably correspond with the architectural choir. Sometimes it includes the crossing and one or more bays of the nave, or again, as at Westminster Abbey, London, and in Spanish cathedrals generally, it is entirely in the nave, from the remaining portion of which it is separated by a massive wall or screen. In buildings where the ritual choir is entirely east of the crossing, the choir screen is placed between the eastern piers of the crossing. In many cathedrals, the organ is placed upon the

choir screen. In several cathedrals the choir is quite as long as the nave, and in some parish churches even longer, but the usual proportion of choir to nave is as one to three. In many French churches the choir terminates polygonally with encircling chapels and this termination is known as a chevet. The choir of the cathedral of Saint John the Divine in New York city is built after this plan. In England the square east end is the most common in Gothic churches, although in Norman ones the semicircular apse is not infrequent. In the Middle Ages, the choir, as the most indispensable portion of the church, was erected first, the nave, regarded practically as a stately approach to the choir, was built later, a century or more sometimes intervening between the completion of the choir and that of the nave. The cathedral of Saint John the Divine in New York is being erected after the mediæval custom. The choir was completed for consecration and service in April 1911, and the construction of the nave was begun in 1916.

CHOIR INVISIBLE, The, a novel by James Lane Allen, published in 1897. It is one of his most popular and pleasing stories, and was enlarged from an earlier story called 'John Gray.' Its scene is the Kentucky of 100 years ago and the fresh picturesque descriptions of pioneer life in Kentucky give the tale historical value.

CHOISEUL-AMBOISE, shwä-zēl-äṅbwäz, **Etienne François,** DUC DE, French statesman: b. 28 June 1719; d. Paris, 7 May 1785; he entered the army in early life and after distinguishing himself on various occasions in the Austrian War of Succession, returned to Paris, where his marriage with the daughter of the financier, Crozat, gave him the command of great wealth, and his intimacy with Madame de Pompadour furnished the means of gratifying his ambition; as he gratified hers by the expulsion of the Jesuits, whom he had come to hate as much as she did. After having been ambassador at Rome, where he obtained from the Pope, Benedict XIV, the celebrated encyclical letter intended to appease the disputes which had arisen on the bull Unigenitus and at Vienna, where he concluded with Maria Theresa the treaty of alliance against Prussia, he became in 1758 Minister of Foreign Affairs. At the same time he was made a duke. He succeeded the marshal of Belle-Isle as Minister of War in 1761, and the same year he became also Minister of Marine. His administration was distinguished by many useful reforms. He reorganized the army and navy which the disasters of previous wars and the neglect of previous administrations had suffered to fall into decay; negotiated the famous Family Compact which reunited the various members of the Bourbon family, and restored Corsica to France. His fall was brought about in 1770 by a court intrigue, supported by Madame du Barry, the new favorite of the king. He was recalled to court on the accession of Louis XVI in 1774, but not again intrusted with power.

CHOISEUL-GOUFFIER, goo-fē'ā, **Marie Gabriel Auguste Florent de,** COUNT OF, French antiquarian and diplomat: b. Paris 28 Sept. 1752; d. Aix-la-Chapelle, 20 June 1817. He was colonel in the Queen's regiment, lived at the court of Marie Antoinette, and was the friend and co-worker with Talleyrand. He early displayed a particular interest in everything relating to Greece. His wish to visit that country was gratified in 1776, and in 1782 appeared the first volume of 'Voyage pittoresque de la Grèce,' which attracted much attention and procured him a seat in the French Academy in 1784. The other volume appeared in 1824. The first was entirely revised by him before his death. The same year he was appointed ambassador to Constantinople, where he remained till 1791. The appointment of ambassador to London was then offered to him, but he remained at Constantinople and sent his official correspondence to the exiled French princes. This correspondence having fallen into the hands of the republicans the convention gave orders for his arrest, but he escaped, taking refuge in Saint Petersburg, where Paul I made him a privy-councilor, director of the Academy of Arts, and superintendent of the imperial libraries. He returned to France in 1802 when his friend Talleyrand again took office and resumed his seat in the Academy. He was made a peer of the realm immediately after the restoration. He also became a member of the privy council, with the rank of Minister of State and Lieutenant-General. His antiquarian researches were chiefly inserted in the memoirs of the National Institute, and his very valuable collection of antiquities is now in the museum of the Louvre.

CHOISEUL-PRASLIN, prā-läṅ, **Eugène Antoine Horace,** COMTE DE, French statesman: b. 23 Feb. 1837. He served in the navy from 1853 to 1865, held some minor offices, and in 1869 was elected to the Corps Législatif. He was first elected to the National Assembly in 1871, and has been several times a member of the chamber of deputies. He is considered one of the leaders of the Republicans. In 1871 he was Minister Plenipotentiary to Italy; in 1880 he became Secretary of State in the ministry of foreign affairs; and in 1887 was sent on a botanical expedition to Ceylon and the United States. He was regarded as very influential in the Republican majority.

CHOISY-LE-ROI, shwä-zē-lé-rwä, or **CHOISY-SUR-SEINE,** France, town in the department of Seine, seven miles south of Paris, on the left bank of the Seine. Its broad, straight streets, elegant houses, and fine avenues, with the proximity of the Seine, contribute to render it one of the most agreeable towns in the vicinity of Paris. It owes its importance to the pleasure château built here by Mlle. de Montpensier in 1682, which was acquired later by Louis XV as a residence. It was destroyed during the Revolution. The church and the town hall were built in the reign of Louis XV. Among its monuments is a bronze statue of Rouget de l'Isle, author of the 'Marseillaise,' who died here in 1836. In its cemetery is his tomb. It has manufactures of wax cloth, soap, hats, chemical stuffs, glass, morocco leather, earthenware, porcelain, and vinegar, and some trade in wine, vinegar, coal, etc. Pop. 15,908.

CHOKE-CHERRY (*Prunus virginiana*), so called from the astringent nature of the fruit, a shrub from 2 to 10 feet high, rarely a small tree, belonging to the family *Amygdalaceæ*. For commercial uses the wild black

cherry (*Prunus serotina*), which is closely allied to *P. virginiana*, is valuable. Its wood is one of the best American woods for cabinet-making. The bark has medicinal properties as a pectoral tonic and febrifuge. The range of choke-cherry is wide, flourishing along river banks and in rocky situations, from Canada to Florida, and west to Colorado and Texas.

CHOKE-DAMP, or **AFTER-DAMP**, the carbon dioxide gas found in mines as a result of the combustion of methane (q.v.), otherwise known as marsh-gas, or fire-damp (q.v.). after explosions. It extinguishes the flame of a candle by depriving it of its oxygen, and asphyxiates any one who ventures into it without special breathing apparatus. The formula in accordance with which it is formed is

$CH_4 + {}_{40}O =$
(fire damp) (oxygen from the air)
$2H_2O + CO_2$
(water) (choke-damp)

CHOKING, a stoppage caused by a morsel of food, a drop of liquid, etc., passing into the larynx or upper opening of the windpipe, instead of the gullet, or an obstruction of the œsophagus itself. It is usually followed by a violent fit of coughing which lasts, in slight cases, till the offending substance is expelled. Sometimes, however, a larger mass — for example, a half-chewed piece of meat — is drawn into the opening of the windpipe, completely blocking it, and arresting respiration altogether. This condition is one of extreme danger; the sufferer becomes purple in the face, and if not at once relieved will die of suffocation. The obstructing substance is usually within reach, and may often be dislodged if a by-stander promptly pushes his forefinger to the back of the throat and attempts to draw the obstruction forward. A child may sometimes be saved by holding it up by the heels and shaking it, or slapping its back. If these measures fail relief may be obtained by means of a sharp-pointed knife promptly pushed into the windpipe to admit air to it below the obstruction. In the case of an animal, remove the obstruction with the hand when possible. Cause the animal to swallow the obstructing substance, if possible, by giving it water, oil or belladonna solution. Carefully push the obstruction down by a probang, if it is possible to effect this, and if withdrawal by the mouth is impracticable. In some cases the gullet has to be cut into by a surgeon.

CHOLAGOGUE, kŏl'a-gŏg. See CATHARTICS.

CHOLERA, kŏl'ĕr-a, **Asiatic**, an acute, infectious disease, endemic in some localities and epidemic in others, characterized by vomiting and purging of a peculiar rice-water-like fluid, and a stage of collapse.

It is usually ushered in by vomiting, purging and griping pains in the stomach, and death may follow in from 1 to 24 hours. If life is retained longer than this time the patient may possibly recover. The mortality is 30 to 80 per cent.

It originated in the East Indies and was not known to migrate for 1,000 years. The oldest Sanskrit writings show that it was known many hundred years before the birth of Christ. There are abundant proofs of epidemics in the 17th and 18th centuries, but it did not spread into Europe until 1830. The Russians took it from India through couriers and stage-coaches. Another peculiarity of this disease is that when it was in Marseilles it broke out in Paris, jumping Lyons, the second largest city in France, notwithstanding the fact that quarantines were in full force.

It was first observed in the United States in 1832, having been brought by immigrants from Great Britain to Quebec whence it found its way across the border to New York. It was also epidemic in the United States in 1835 and 1836. In 1848 it was brought into the country by way of New Orleans, traveled up the Mississippi Valley and thence across the continent to California. Other years in which it prevailed with greater or less severity were 1849, 1854, 1866, 1867, 1873, 1884, 1892, 1893.

Since 1873 it has had no positive foothold in the United States or Great Britain, but in the Philippine Islands it has prevailed since 1901 though it is now under control. It has prevailed in the Orient since 1901 and it was severe in Russia from 1907 to 1911. In 1911 it was prevalent in Italy, North Africa, Madeira, Asia Minor, Arabia and Turkey. It still prevails in India where it is always endemic. Several cases were brought to the United States on shipboard in 1911, and a number of so-called *cholera-carriers* were detained until the evidences of the disease disappeared. There was no extension of the disease from the port of entrance (New York).

Etiology.— The undoubted cause of the disease is the comma bacillus which was discovered by Koch in 1884. It is about half as large as the tubercle bacillus, but is somewhat thicker. Under high magnification it resembles a bent rod, or a short spiral. It is about $\frac{1}{5000}$ of an inch in length. It will grow in water at ordinary temperatures, and was isolated from the water tanks at Hamburg during the epidemic of cholera which visited that city in 1892. It is said to live at temperatures ranging from — 15° to 104° F. The bacteria are located chiefly in the intestines, as, according to Dr. Koch, none have been found to exist in the blood or in any of the other organs. In the lower section of the lower intestines they are found in greatest abundance, also in the dejecta, but not often in the vomit. It is said that the bacilli cannot live in the stomach.

In post mortem the organisms were found by Koch in the intestines but not in other internal organs. They have often been found in the fæces of persons who are apparently healthy, during an epidemic, such persons being the so-called cholera-carriers.

The symptoms of the disease are apparently due to the absorption from the intestine of toxic material generated by the bacilli.

It is asserted that these comma bacilli destroy the blood corpuscles within a pretty wide range, and it is fair to conclude that they also destroy more or less of the surrounding tissues.

Transmission.— The disease is contagious but not highly so. Those who wash the clothing and bedding of cholera patients often contract the disease, and so do those who come in direct contact with the body, as undertakers, orderlies, etc., but such attacks are probably due to imperfect hygienic precautions on the part of the victims. Physicians and nurses

suffer with comparative infrequency from cholera. Animals may be readily immunized to the disease by first injecting a suitable culture of the dead organisms and following it with the injection of a culture of living organisms. Many human beings have a natural immunity to it. It is demonstrable that it may be conveyed by vegetables, especially by raw ones, by milk and by other forms of food.

The two agencies by which it is most frequently conveyed are house flies, which carry the bacilli directly from the *dejecta* of cholera patients to milk and other food, and water which is constantly polluted in the countries in which cholera is present. Military camps and barracks are notorious breeding places for cholera. In certain parts of India the water for bathing is also used for drinking purposes and it seems impossible to prevent the natives from thus using it and from suffering the inevitable consequences.

Melville ('Military Hygiene and Sanitation,' 1912) states that cholera has disappeared from the British army in India since the water supply has been improved and regulated. The disease is seldom conveyed by the air; its development is favored at the sea-level, by a moist soil, and by a high temperature. It is common to all ages and usually attacks the debilitated in preference to the robust.

Pathological Anatomy of Cholera.— After death the stomach contains more or less of the whey-like albuminous fluid and is full of cast-off epithelium. The small intestines usually contain a large quantity of the whey-like fluid and epithelium. The glands of Brunner, the solitary and agminated patches, are thickened and very prominent. The solitary glands of the large intestines are also infiltrated and swollen. The liver is more or less advanced in fatty degeneration. The kidneys have a pale, white appearance, due to the epithelium blocking the tubes. The bladder is empty and contracted. The lungs are congested. The right cavities of the heart are distended with blood, while the left cavities are empty and contracted.

Clinical History.— When the disease runs its typical course it has three stages: (1) The preliminary or stage of invasion. (2) The stage of collapse. (3) The stage of reaction. It is preceded by a period of incubation which ordinarily lasts from two to five days.

It would seem probable, however, that during a virulent epidemic when people are overcome by fear, fatigue, anxiety, etc., the period of incubation may in some cases be hardly appreciable.

1. In the preliminary stage there is more or less profuse diarrhœa which may be ushered in abruptly and with or without fever, or it may be attended with pain, vomiting, headache, great depression of spirits, etc.

2. In the stage of collapse there is still profuse diarrhœa with pain and straining. There is also great exhaustion and great evidence of shock; the countenance is ghastly, there is sub-normal temperature, and a scarcely perceptible pulse. This condition is frequently followed by unconsciousness and death. The stools are at first yellow from the biliary coloring matter, then whitish, resembling rice water, and they contain blood, mucus, etc., and have an alkaline reaction. The glandular secretions are arrested with the exception of those of the sweat glands; the "cold sweat" is characteristic of this stage. In nursing women the secretion of milk is sometimes maintained.

3. If the patient survives until the stage of reaction the warmth and color will gradually return to the surface, the pulse will again become perceptible, urine will again be secreted, the stomach will become less irritable, and the stools less frequent. Relapses are not uncommon and a patient may apparently be convalescent when suddenly his bad symptoms return with uræmia, unconsciousness and death. Complications are always possible. Those which occur most frequently are the typhoid condition, nephritis, pneumonia, pleurisy, abscesses in various portions of the body, and the formation of diphtheritic membrane upon the mucous surfaces. The diagnosis of the disease is seldom difficult, and can almost always be readily made during an epidemic. The prognosis is uncertain, varying greatly with the type of the epidemic and the resisting power of the individual.

The Prevention and Treatment of Cholera. — While the treatment of this disease must vary in accordance with local conditions, there are certain methods and regulations which may be regarded as generally applicable.

No specific treatment has as yet been discovered for it, and living writers with extensive experience in India, where it has been more prevalent during the past ten years than in all the rest of the world, declare that a symptomatic and expectant plan of treatment is as good as any. Latham and English, like others who have worked among Asiatics, admit great difficulty in carrying out preventive measures for a germ disease which is conveyed by polluted water. Natives in India simply will not take the precautions which are indispensable, in regard to drinking water, to prevent the spread of cholera, precautions which are always necessary when the water supply comes from storage tanks, wells, polluted rivers, etc.

The adequate protection of such people is a hopeless task, but there are always more or fewer white people in such countries who must also be protected and with whom an appeal to reason is not apt to be disregarded.

In countries in which cholera is epidemic or endemic, therefore, the areas in which water is collected, that is to say water sheds, must be protected, religious pilgrimages by which cholera is constantly carried from one country to another must be discouraged by government, and the milk supply, which is so easily contaminated by polluted water, by flies, and by other food, must undergo rigid public supervision.

Preventive measures on the part of local and general governments will also consist in keeping the public streets absolutely clean, in efficient drainage, in careful collection and disposal of garbage and sewage, in fumigation and disinfection of public and private buildings and private property wherever such attention may be called for. Preventive measures on the part of individuals may consist in (1) Preventive inoculation. (2) Personal hygiene. (3) The treatment of all forms of diarrhœa and of bowel disorders in general.

1. Haffkine's method of preventive inoculation is as efficient as any which has yet been tried. It consists in the subcutaneous injection

of a culture of living and virulent cholera microbes. An injection of nine minims has been found sufficient as an average dose for an adult. The germs die shortly after their injection, and yield an antitoxin which gives protective immunity from cholera for a few weeks or months though it was not found that it had materially lessened the mortality from cholera in India.

2. As to personal hygiene those who are new arrivals in a cholera infested district are usually more susceptible to the disease than those who are acclimated.

As far as possible, in the presence of cholera, fatigue, worry, the use of unripe fruits and uncooked vegetables must be avoided. Decomposed food, especially fish, must be avoided with religious care, also stale milk, unboiled or dirty water and alcohol in all forms. Food should be carefully screened from flies; flies should be kept out of the house and should not be allowed to breed in yards and stables. Milk and water should be boiled, the hands and vessels of all kinds should be kept scrupulously clean and if a water filter is required only one of some standard variety should be used.

3. In the preventive treatment of bowel disturbances salines and purgatives should be avoided and a choice may be made from the following astringents: chlorodyne, laudanum, catechu, kino, asafœtida, black pepper and opium, lead and opium, and chalk and opium. If a person has diarrhœa, when cholera is epidemic it will be wise for him to go to bed and remain there until his diarrhœa is relieved.

Treating during the disease varies according as the stage is that of (1) invasion, (2) collapse or (3) reaction.

1. In this stage it is essential that the patient be in bed, in the recumbent position and that the bed be warm and the body dry. The room should be darkened and kept at a temperature not exceeding 70° F. The patient must be kept quiet, he must have little or no company and be given plenty of iced water, but not enough to provoke vomiting. For the relief of the cramps in the bowel he may inhale chloroform, or be rubbed with a suitable anodyne liniment, or applications of turpentine or mustard may be applied to the abdomen. Morphine may be given hypodermically if necessary. The antitoxic sera have been used in various countries in the treatment during this stage but without very satisfactory results. The Japanese are the only ones who speak with confidence of this method of treatment.

2. In the stage of collapse it is necessary to stimulate the patient as vigorously as his strength will allow. Alcohol in the form of brandy, whisky, or champagne may be given by mouth, also nitrite of amyl, nitro-glycerine, and hypodermics of ether. A very efficient form of treatment consists in the intra-venous injection of a normal saline solution. A pint may be injected in the course of ten minutes and this may be given as many as three times if the conditions warrant it.

3. In the stage of reaction the bladder and kidneys must be carefully attended to for there is sometimes suppression of the urinary secretion or retention of urine within the bladder. In such cases heat may be applied over the kidneys, or wet or dry cupping be practised. The retained urine must be withdrawn with a catheter. If the diarrhœa continues hot injections of a suitable astringent may be slowly administered, and bismuth may be given by mouth.

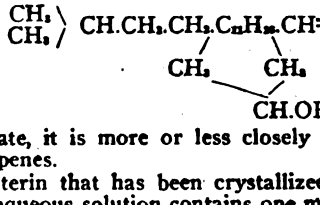
In all cases the food must be simple and easily digested, the stools disinfected, the clothing sterilized, and the hands of nurses and attendants sterilized.

Bibliography.— Latham and English, 'A System of Treatment' (1912); Osler, 'Principles and Practice of Medicine' (1912); Melville, 'Military Hygiene and Sanitation' (1912); Burnet, 'Microbes and Toxins' (1912); Burgey, 'Principles of Hygiene' (1912).

ANDREW F. CURRIER, M.D.

CHOLERA INFANTUM, an acute infectious disease of infants, due in large part to a definite micro-organism, the *Bacillus shiga,* or allied species, characterized by acute gastro-enteric inflammation, with nausea, vomiting, diarrhœa, high temperature, wasting and prostration. Death may result in a very short time. The child may be attacked suddenly, but it is more liable to occur in children who have been somewhat run down from a mild diarrhœa of indigestion. The child is then taken with the cholera-like diarrhœa, passing thin serous- or rice-water discharges, 10 to 20 a day. The temperature rises abruptly to from 103° to 105° F. and there is constant vomiting. There is rapid emaciation and prostration, the child having strength only to moan or cry with a sharp irritable sound. Dullness, stupor, and at times convulsions precede death. Treatment should be prompt and requires skilled medical attendance. Acute summer diarrhœa of infants is not necessarily cholera infantum. In fact cholera infantum is not a common disease, whereas the acute diarrhœas of children, resulting from tainted foodstuffs, are very common. Every case of summer diarrhœa, however, should receive vigorous treatment, because it offers an opportunity for the *Bacillus shiga* to develop cholera infantum.

CHOLESTERIN, kō-les'tĕr-in (Gk. χολή, bile, and στερεός, solid). An unsaturated monatomic secondary alcohol which is found in small amounts in most animal fluids, and is abundant in the nervous system in wool-fat, in the yolk of eggs, and more particularly in gall-stones, where it usually is the chief ingredient. Its empirical formula is still a matter of dispute. Obermüller considers that it is $C_{26}H_{44}O$ while Mauthner and Suida regard it rather as $C_{27}H_{46}O$. Windaus considers that its structural formula is



At any rate, it is more or less closely related to the terpenes.

Cholesterin that has been crystallized from a heated aqueous solution contains one molecule of water of crystallization. Its melting-point is 148.5°C. It consists of thin plates of a nacreous lustre, and is greasy to the touch.

Cholesterin, together with certain other

lipoids or fat-like bodies, is to be found in the cell-walls of the red blood corpuscles. This is perhaps to be connected with the fact that cholesterin prevents the hæmolytic action of certain poisons, for example saponin.

Substances closely related to cholesterin are found in fæces, in wool-fat, in the tissues of sponges and of the silkworm, and in all vegetable fats, being found in the largest quantities in the fats of the pea and of the Calabar bean. These various substances, called "cholesterins" in a loose sense, may be distinguished from cholesterin proper by various color reactions or by the determination of their melting-points. The commonest vegetable analogue of cholesterin is known as *phytoserin*, and vegetable fats may be distinguished from animal fats on account of the fact that whereas animal fats in general contain traces of cholesterin, vegetable fats contain traces of phytosterin. Consult Windaus, A., article on "Sterine" (in *Biochemisches Handlexikon*, Vol. III, 1911); Bang, J., 'Chemie und Biochemie der Lipoide' (1911); v. Fürth, O., 'Probleme der physischen und pathologischen Chemie' (1912).

CHOLET, shō-lā', France, town in the department of Maine-et-Loire, on the right bank of the Maine, 32 miles southwest of Angers. It has a tribunal of commerce, consulting chamber of manufactures and communal college. Its manufactures include handkerchiefs and cotton goods, called *cholettes*, flannels, and woolen stuffs, which industries in this and surrounding territory employ between 50,000 and 60,000 operatives. There are also wool and cotton spinning-mills, bleachfields, dyeworks and tanneries. There is a great trade in cattle, lumber and grain, the markets for which are attended by a large concourse of buyers from other parts. Granite is quarried near by. The first considerable growth of the town was when a colony of weavers settled here under Edouard Colbert, Count of Malévrier. Here during the Vendean War, two actions were fought in 1793, in both of which the Royalists were decisively defeated. Pop. 21,058.

CHOLIAMBUS, kō-lī-ăm'bŭs (Greek, *χολιάμβος*, the lame iambus; also called *skazon*, from *skazo*, to halt; or *versus Hipponacticus*, because the satirist Hipponax of Ephesus made use of it, or perhaps invented it), an iambic trimeter, the last foot of which, instead of being an iambus, is a trochee or spondee, which gives it a lame motion, as, for instance, Martial, l. i. pray. v. 3.

> Cur in theatrum, Cato severe, venisti?
> An ideo tantum veneras, ut exires?

We perceive, from the construction of the choliambus, that it may be applied with advantage to produce a comic effect. The Germans have happily imitated this verse, as well as all other ancient metres. An instance of a German choliambus is —

⏑ — ⏑⏑ — ⏑ — ⏑ — ⏑ — — ⏑

Der Choliambe scheint ein Vers für Kunstrichter.

CHOLIC (Gk. *χολή*, bile) **ACID** ($C_{24}H_{40}O_5$), a non-nitrogenous acid produced by decomposing the true biliary acids with an alkali. It does not exist in bile ready formed; but is found in the contents of the intestines and in the excrement. It is crystalline, sparingly soluble in water, but readily soluble in alcohol and ether. The cholates are rather obscurely crystalline; they are not very soluble in water, but rather more so in spirit. Both the acid and salts have a bitter taste.

CHOLINE, kŏl'ĭn (Gr. *χολή*, bile), a basic body ($C_5H_{15}NO_2$) found in both plants and animals. In animals it is apparently one of the reduction compounds of proteids, being a trimethyl oxyethyl ammonium hydroxide. It is of interest in medicine chiefly because of its close affinities to two very poisonous compounds, into either of which it may be converted. By oxidation it builds neurine, a highly poisonous body; and by hydration it becomes an alkaloid-like body closely resembling the plant alkaloid muscarine, from the poisonous mushroom *Amanita muscaria*. Thus choline may be one of the auto-intoxicating substances that may be developed in the human body if its normal metabolism is disturbed. It may also be a factor in the so-called ptomaine poisoning.

CHOLMONDELEY, chŭm'lĭ, **Mary**, English novelist. Her fictions have been extremely popular and include 'The Danvers Jewels'; 'Sir Charles Danvers'; 'Diana Tempest'; 'A Devotee'; 'Red Pottage'; 'Moth and Rust'; 'The Lowest Rung'; 'Notwithstanding.'

CHOLOCHROME, kŏl'ō-krōm (Gr. *Χολή*, bile, *Χρῶμα*, color), or **CHOLOPHÆIN**, the brown coloring matter contained in bile and in the intestines, and the substance coloring the fæces and the skin in jaundice. It is also a general term for bile pigments of every kind.

CHOLOPHÆIN, kŏl-ō-fē'ĭn, also known as biliphæin (from L. *bilis*, bile, and Gr. *Φαιός*, dusky); an impure bilirubin.

CHOLOS, shō'lōz, in Peru, the name for those who are partly of white, partly of Indian parentage, the most numerous class of the community.

CHOLULA, chō-loo'lą, Mexico, city in the state of Puebla. It is 12 miles west of La Puebla, with which it is connected by rail, and 60 miles southeast of the city of Mexico. The streets are regular and spacious, the houses mostly of one story, and flat-roofed. It is well built and contains a pyramid of clay and brick supposed to have been built by the aborigines in honor of one of their deities and surmounted by a half-ruined chapel, probably erected by Cortés. Cholula, at the time of Cortés, was a flourishing city of 20,000 houses and a large number of temples. It was the chief city of a semi-independent state settled by a tribe of the Nahuatl race. The inhabitants carried on a considerable trade and had a more or less democratic form of government. It was visited by Cortés in 1519, and in spite of his friendly reception by the inhabitants, he massacred a number of them, suspecting them of plotting against the Spaniards. Pop. about 9,000.

CHONDROMA. See TUMOR.

CHONDRO-SARCO'MA. See TUMOR.

CHONDROSTEI, kŏn-drŏs'tę-i, an order of acanthopterygious fishes of lowly organization, the sturgeon, paddle-fishes and their fossil predecessors. The internal skeleton is but little ossified, the vertebræ and most of the skull remaining in a stage of pure cartilage; but the skull is enclosed by close-fitting dermal bony plates. There are no true scales, but a small number of longitudinal rows of large bony

plates, with granules on the intervening skin. The elongated snout, stout body, large fins and strongly heterocercal tail complete the aspect of these survivors of a once dominant race that flourished from the Lower Devonian through the Mesozoic, except the Cretaceous period, from after the Eocene steadily diminished, until of seven great families only two remain, represented by a few species that exhibit degeneracy from the ancient type. Consult Woodward, 'Vertebrate Paleontology' (Cambridge 1898).

CHONDRUS (Gr. Χόηδρος, gristle, cartilage) kŏn'drŭs, the genus of seaweeds to which carrageen or Irish moss (*chondrus crispus*) belongs.

CHONOS, chō'nŏs, **ARCHIPELAGO,** or **GUAYTECAS ISLANDS,** a group of islands belonging to the Chilean province of Chiloé, lying off the west coast of Patagonia, mostly between lat. 44° and 46° S., and long. 74° and 75° W. Two are large, but they are nearly all semi-barren and scantily inhabited by Chonos Indians. Magdalena is the largest island, and the only settlement of any importance is Melinka.

CHOP-STICKS (Chinese, *kwai-tsz,* "nimble or diligent lads"), two smooth sticks, about the thickness of a quill, of bamboo, wood, or ivory, which are used by the Chinese for conveying meat or vegetables, particularly rice, to the mouth. The chop-sticks are used in various manners, serving partially the purposes of a fork and a spoon. The most curious mode of using the chop-sticks is when a bowl of rice is brought close to the lips, the mouth held wide open, and the grain dexterously dashed into it, with the chop-sticks, held one on each side of the forefinger, and plied with a rapid motion quite suggestive of the Chinese title.

CHOPIN, shō-păn' **(François), Frédéric,** Polish pianist and composer: b. Zelazowa Wola (near Warsaw), 1 March 1809; d. Paris, 17 Oct. 1849. Chopin, in the words of Saint-Saëns, "revolutionized the divine art and paved the way for all modern music"— certainly for all pianoforte music. His father, Nicholas Chopin, was born in 1770, at Nancy, Lorraine, and emigrated to Warsaw, in 1787, where he was at first a bookkeeper, and subsequently a professor of French in the Lyceum. He was reputed to have Polish blood in his veins, and, in 1806, he married a Polish girl, Justina Krzyzanowska, the daughter of "poor but noble parents," who bore him three girls beside Frédéric, who inherited from her the intense love of his native country and its art, which is one of his most striking characteristics. He got his first lessons on the pianoforte from a Bohemian composer named Zywyny, and made such rapid progress that he was able to play a concerto in public before he was nine years old. Three years later he entered the Lyceum and also took lessons in counterpoint and harmony from the head of the Warsaw Conservatory, Joseph Elsner, who, while teaching him the value of hard work, had sense enough to recognize his genius and to allow his striking individuality free play. While a student at the Lyceum, he wrote a one-act comedy with his sister, and otherwise showed such an interest in the stage that it seems strange he did not, in subsequent years, write an opera.

The earliest compositions of Chopin were national dances (mazurkas, polonaises, waltzes, a krakowiak, etc.). Some of these were played at the public concerts he gave at Vienna, in August 1829 and again the following year, on which occasion the critics put their fingers on some of the most marked peculiarities of his style — the unconventional accents in his phrasing, and the "mèlancholy tints in the style of his shading." In March 1830, having made up his mind to visit Paris and London, he gave a farewell concert at Warsaw, which was so successful that two more had to be given. In November he became traveling virtuoso, visiting Breslau, Dresden, Prague, Vienna, Munich and Stuttgart. This trip was financially a failure, and he had to write home for money to pay his fare to Paris. He was 22 years old when he reached that city, which was thenceforth to be his home. At Stuttgart he had heard of the capture of Warsaw by the Russians. There was much sympathy for unfortunate Poland in Paris, and Chopin profited by it socially. He soon became a favorite of the aristocracy, and a friend of the men and women of genius who at that time made Paris their permanent or temporary abode; Meyerbeer, Liszt, Berlioz, Mendelssohn, Heine, George Sand, the Countess L'Agoult, Cherubini, Bellini, Balzac and others. Among these his genius found sympathetic appreciation, but the musical world in general never suspected that he was an epoch-making composer, even after he had lived in the French capital for 18 years. "He is underestimated," wrote George Sand, and Liszt said: "Whoever could read in his face could see how often he felt convinced that among all these handsome, well-dressed gentlemen, among all the perfumed, elegant ladies, not one understood him." Had his contemporaries even suspected his real greatness he might have lived in luxury from the sales of his compositions (which have since his death enriched many publishers), or from a few public concerts. As it was, his concerts grew fewer and fewer, and he had to support himself by giving lessons. As a teacher he was much in demand.

Worshipped by women, Chopin had a mind most susceptible to feminine charms. One of the young ladies he fell in love with, Constantia Gladkowska, assisted him at his farewell concert at Warsaw. She wore his engagement ring, but married another man. The adagio of the F minor concerto is an echo of his transient infatuation. In 1836 he proposed to Maria, the daughter of Count Wodzinski, but she refused him. In the following year, Liszt introduced him to the brilliant novelist, Mme. Dudevant, known to the world as George Sand. At first, Chopin did not feel attracted to her, but she knew how to overcome his coyness and ensnare his affections. A French writer says of her that "when she was writing she would often ask Chopin to sit down by the piano and improvise, and inspired by his playing, she wrote some of her finest novels." For a time, no doubt, her vivid imagination and her sympathy and appreciation of his music stimulated his genius, too. A romantic episode in his life is the four months he spent with George Sand and her son and daughter on the island of Majorca in quest of health. It was during this sojourn (1838) that he wrote the most marvelously inspired of his works, the 'Pre-

ludes,' as is proved by his letters and George Sand's 'Histoire de ma vie.' The natives, on discovering that he was suffering from consumption, shunned him as if he had the plague, and he found it difficult to secure satisfactory lodgings. This, combined with the rainy weather, aggravated his illness. George Sand found him "a detestable invalid," whereas his pupils declared, after his death (his friendship with the novelist terminated nine years after the return from Majorca) that she had killed him by her fickleness and cruelty. He visited England in 1848, but was already so weak that he usually had to be carried upstairs. His last days were made comfortable through a gift of $5,000 from a noble Scotchwoman and pupil of his, Miss Jane Stirling. Mozart's Requiem was sung at his funeral, and he was interred near the graves of Bellini and Cherubini in the cemetery of Père-la-Chaise.

Music is, as Rubinstein remarked, the most aristocratic of the arts, and Chopin was the most aristocratic of musicians. No other composer equals him in the elegance and polish of style, which resembles that of the best Parisian literature. This is the French side of his genius. Equally fascinating, and much more vital, is its Polish side. Chopin contributed a new national element to the world language of music (as did the Hungarian Liszt in his day, the Bohemian Dvorák and the Norwegian Grieg afterward). This Polish element characterizes all his works more or less, but particularly the songs, mazurkas and polonaises. Of the songs there are 17; they are simple in structure, but delightfully melodious, and several of them are as realistic reflections in music of the moods of the poems as are the best songs of Germany. The mazurkas, of which there are 56, are like as many orchids; no two are alike, yet all resemble one another. They are in three-four time, graceful, melancholy, tender. To most pianists they are music of the future; only those can properly interpret them who have mastered the Polish "zal" and the Polish "rubato." The zal is a "compound of pain, sadness, secrecy, rancor, revolt," such as naturally characterizes a nation with a tragic history like that of Poland. The tempo rubato is misrepresented in the biographies of Chopin, the writers of which have attached too much importance to Chopin's alleged injunction to his pupils that the left hand must keep strict time, while the right hand melody fluctuates freely. Berlioz attested, on the contrary, that Chopin "could not play strictly in time." There can be no doubt that in his playing, as in Liszt's, Rubinstein's, and Paderewski's, both hands frequently retarded and accelerated, scorning the metronomic regularity of the dance hall. The mazurkas have the *varium et mutabile,* the coquettish quality, of woman; they represent the feminine side of Chopin's genius, as do the dainty, graceful, lively valses (13 in number) which have been called "dances of the soul and not of the body;" and the 19 nocturnes, with their sweet melodies and dreamy, languorous harmonies. It is no longer permissible, however, to exaggerate this feminine side of Chopin's genius. The refinement of his style and the exaggerated accounts of his ill-health and feebleness (before his last illness) have distorted his image. He really had the "soul of a lion;" many of his works betray a strength, a virility, not surpassed by any other master.

To this class of his works belong his 15 polonaises, his four scherzos, four ballades, three impromptus, four fantasias, three sonatas and most of the 27 etudes and 25 preludes. The polonaises represent the chivalrous, martial side of Chopin's and Poland's genius. The scherzos are of marvelous originality, with a strong undercurrent of sadness — hallmark of Poland. The ballades are a creation of Chopin's genius, in form as well as in content; they are legends without words. The impromptus, also, apart from their contents, give evidence, like the ballades, the scherzos and the fantasias, of Chopin's skill in creating new patterns of musical form. The sonatas contain some of his best inspirations; they have been criticized for lack of coherence, but, as a matter of fact, there is quite as much coherence between the movements as in the sonatas of Beethoven. The etudes are infinitely more than technical studies; they include some of Chopin's most poetic pieces. The preludes Rubinstein considered the pearls of Chopin's work, and it may be asserted safely that, page for page, they contain more of the essence of musical genius than the same number of pages by any other master. Like many of the other works, they reveal Chopin as one of the three or four greatest creators of new melodies, harmonies, modulations and rhythmic variations and combinations in the whole realm of music. He started out with what he called the "perhaps bold but noble determination to create a new epoch in art," and he succeeded. Schumann pronounced him "the boldest and proudest poetic spirit of the time" and called the G minor nocturne "a terrible declaration of war against a whole musical past." Chopin revolutionized the art of writing pianoforte pieces as thoroughly as Wagner did the method of writing operas. Liszt and all other subsequent pianists followed in his footsteps. By the use of the sustaining pedal to unite the tones of scattered chords he marvelously enriched the harmonic capacities of the pianoforte, and at the same time added countless new tints and shades to its color scheme. He was "the soul of the pianoforte," as Rubinstein called him, the most idiomatic of all writers for that instrument.

All of his works are for or with pianoforte. Beside those named, mention must be made of two concertos; a trio with violin and 'cello; a 'cello sonata; an introduction and polonaise for the same instrument; several fantasias and sets of variations; three ecossaises; a berceuse; a bolero; a barcarole; a tarantella; three rondos. Of the books on Chopin the best is Huneker's, which also contains analyses of all the pieces and a complete bibliography. Niecke's work in two volumes is more elaborate, but less commendable in its judgments. Liszt's book on Chopin is not always reliable, but contains valuable hints. Other books and essays are by Karasowski, Kleczynski, Janotha, Willeby, Bennett, Schucht, Niggli, Hadow, Ehlert, Lenz, Johnson, Finck. The different editions of Chopin's works are excellently discussed by Huneker; consult also the essay on the 'Greater Chopin' in his 'Mezzotints in Music.'

HENRY T. FINCK,
Musical Editor of 'New York Evening Post.'

CHOPIN, chŏp'ĭn, a Scotch liquid measure containing two imperial pints. The chopin, in name at least, was derived from the French, with whom a similar measure was in use till the introduction of the metric system. The French *chopine* was not a uniform measure, but varied according to localities. That of Paris was a little over four-fifths of an imperial pint.

CHOPIN, chō-pēn', an elevated shoe or clog, introduced into England from Venice in the reign of Queen Elizabeth, and which became the fashionable wear of court ladies during that reign. The Venetian chopines were made of wood covered with leather of sundry colors, white, red, yellow and sometimes gilt. Some were of great height, the height of the chopine being regarded as a mark of the rank of the wearer. To such a degree of extravagance was this carried that women of rank could not walk without being supported. This silly fashion does not seem to have been carried to the same excess in England. Hamlet (act ii, scene 2) addresses one of the players, "Your ladyship is nearer to heaven than when I saw you last by the altitude of a chopine."

CHOPTANK RIVER rises in Kent County, Del., flows southwest into Maryland, and near the south extremity of Talbot County spreads into an estuary several miles wide and nearly 20 miles long, through which it empties into Chesapeake Bay; total course, 100 miles. It is navigable for sloops to the mouth of Tuckahoe River, a distance of about 50 miles.

CHOPUNNISH, chō-pŭn'ĭsh, or **NEZ PERCÉ,** a tribe of North American Indians, also known as Nimapu, or Sahaptian, the principal tribe of the Sahaptian confederation, who now live on the Nez Percé Reservation, in Idaho, and numbered 1,534 in 1906. At the same time there were 83 on the Colville Reservation in Washington. The name Nez Percé originated from the custom formerly followed of piercing the nose. In the Nez Percé War of 1877 the tribe was under the control of Chief Joseph, who forbade his men to interfere with any white non-combatants. See SAHAPTIAN INDIANS.

CHORAGIC, kō-răj'ĭk, **MONUMENT,** in ancient Greece, a monument erected in honor of one who had gained a prize as "choragus," or organizer of the play and chorus. The remains of two very fine monuments of this sort are still to be seen at Athens, namely, those of Thrasyllus and of Lysicrates, the last popularly called the Lantern of Demosthenes.

CHORAGUS, kō-rā'gŭs, or, **CHOREGUS,** among the ancient Greeks, the musician who directed each of the choruses furnished by the 10 Attic tribes for the public festivals; also the citizens who defrayed the expense of each chorus. (Such an office was established in Oxford University in 1626, but did not last long). The person of the Greek choragus was inviolable, as well as those of the members of the chorus. The choragus who was adjudged to have performed his duty best received an ornamental tripod, engraved by a skilful artist, and bearing the name of the tribe which had gained the victory, of the citizen who had paid the expense, and of the master who had trained the choir. These tripods were set up as public monuments on pillars or other structures. A street in Athens which contained a great number of such monuments was called the Street of the Tripods. The most remarkable of these monuments yet remaining is the choragic monument of Lysicrates. (See CHORAGIC MONUMENT; CHORUS). Consult Gardner, E. A., 'Ancient Athens' (New York 1902); Weller, C. H., 'Athens and its Monuments' (New York 1913).

CHORAL, or **CHORALE** (Ger. *choral* and *corale*). This form of melody, to which sacred songs or hymns are sung by the congregation in unison, may almost be said to belong exclusively to the German Protestant Church, this style of music having been introduced by Luther in the early part of the 16th century. These hymns were written by Luther in the vernacular, founded on the simpler tunes, and arranged to music which was more rhythmic than that in general use. This change appealed to the people and brought out the wonderful power of music to kindle religious passion. This change also had a great effect upon church music throughout Germany, and within a short time after its introduction a literature of remarkable dignity, simplicity and earnestness was produced. During the 16th and 17th centuries many excellent examples of chorales were brought forth, probably the most important, though not the first, of the early collections being the 'Enchiridion,' or hand-book, published by Luther and his friend Walther, at Erfurt, in 1524. This book contained a preface by Luther himself, and was undoubtedly the foundation for the extensive number of collections which continued to appear till the latter part of the 17th century, but which, for many reasons, religious as well as political, shortly after that time ceased to be popular. Chorales were generally accompanied on the organ, and this custom, together with that of playing and writing so-called figured chorales, soon led to a greater development of harmony and counterpoint, so that the art of playing became of first importance to the successful singing of the chorale.

Many of the chorales were original, many were revisions of old church tunes, and some were adapted from altogether secular sources. Of these latter, the most famous collection was that of Claude Goudimel, published in Paris in 1565, the majority of which were soon incorporated into the German collections, and one of which, 'Old Hundred,' became very popular in England. Others taken from secular sources are 'Herr Christ der einig' Gott's Sohn,' taken from 'Ich hört' ein Fräulein klagen,' and 'Herzlich thut mich verlangen,' which appears several times in Bach's 'Matthäus-Passion,' taken from 'Mein Gemuth ist mir verwirret.' On the other hand, there are many based upon church tunes, such as 'Der Du bist drei,' taken from 'O beata lux Trinitatis,' and Mendelssohn's 'Allein Gott in der Höh', sei Ehr'.'

The authorship of many chorales is, however, obscure and uncertain, such as the 'Es ist gewisslich,' generally attributed in England to Luther. But of his authorship of the famous 'Ein' feste Burg is unser Gott' there is but little doubt, and it has been incorporated into the compositions of Meyerbeer in 'The Hugue-

nots,' of Mendelssohn in his 'Reformation Symphony,' of Wagner in his 'Kaiser Marsch,' and of Bach in one of his cantatas. One of Johann Crüger's chorales, 'Nun danket alle Gott,' became well known in England from its incorporation in Mendelssohn's 'Lobgesang.' See GREGORIAN CHANT.

CHORAL SERVICE, a service with intoned responses, and the use of music throughout wherever it is authorized. The service is said to be partly choral when only canticles, hymns, etc., are sung; wholly choral, when, in addition to these, the versicles, responses, etc., are sung.

CHORAL SOCIETIES. A choral society is a body of amateur singers formed for the purpose of studying and performing large choral works. Formerly all chorus singers were professional musicians, and the chorus that took part in the production of an oratorio did not usually number over 40, while the orchestra was frequently larger than this.

To-day all choral societies consist of amateurs and are much larger than their professional predecessors, while the orchestra is only slightly increased in size. An average chorus numbers 150 to 200 voices, while the orchestra varies from 35 to 60 men. It is possible that the magnificent effect of the chorus formed to celebrate the centenary of Handel's birth by performances given in Westminster Abbey and the Pantheon in London in 1784 may have been a great factor in the formation of choral societies in England. This chorus was the largest that had ever been formed up to that time. It numbered 274 and the orchestra 251. At a subsequent festival in 1791 the chorus and orchestra were said to have numbered over 1,000, while for the Handel Festival held in the Crystal Palace in London in 1874 the chorus numbered 3,200 and the orchestra over 500.

It is very doubtful, however, whether such a large body of singers and players is very materially more effective than a smaller one. The impression on first hearing an enormous chorus is nearly always one of disappointment at the volume of sound. The explanation is made that the large hall necessary for such a large chorus and audience causes a loss of quantity of tone, but this is disproved by comparisons made at a Saengerfest held in Philadelphia, Pa. Here the effect of the entire mass chorus of 5,000 male voices was not much greater than that of a single society of 250 voices. There was a difference, of course, but the volume was not 20 times greater, not even twice as great.

A well-balanced chorus of from 200 to 500 voices is now generally acknowledged to be more effective and much easier to command than the overgrown chorus assembled for a festival. Choruses of this size are very numerous in the United States, Germany and England, where choral work, both religious and secular, is highly appreciated and supported. It is remarkable that France and Italy, both musical countries and more devoted to vocal than to instrumental music, do not cultivate choral music more generally. Even Berlioz in writing out his list of an ideal musical force to have at command makes his orchestra almost equal in number with his chorus, showing that he had a professional chorus in mind, and that therefore in his time (died 1869) a choral society of amateurs was perhaps unknown.

The Berlin Singakademie, still in existence and world renowned, was the first permanent choral society. Founded in 1791 with 27 members it now numbers 600. Mendelssohn was at one time its conductor.

In the United States the first choral society was the Stoughton (Mass.) Musical Society (1786), the outgrowth of a "sacred singing school" founded in 1724. The Handel and Haydn of Boston (1815) was of much greater importance, however, and is to-day one of the most important choral societies in the New World. Until 1847 the president of the society was its conductor, but with the increase of musical ability and criticism it was felt that the time-honored custom would have to be given up. Under Bergman (1852) and Zerrahn (1854) it increased in numbers and ability. Within the last few years under Mollenhauer a thorough reorganization took place and the society rapidly recovered the position which it had to some extent lost.

The Cecelia Society, founded in 1900, under the direction of B. J. Lang, has done good work in the field of choral music.

In New York a number of choral societies, the Handel and Haydn, the New York Choral Society and the New York Sacred Music Society, dating from 1819 to 1849, fostered the taste for choral music. After this for more than 20 years no long-continued effort was made to carry on the work, until in 1873 Dr. Leopold Damrosch founded the Oratorio Society which, beginning with about 50 members, now numbers nearly 300. Walter Damrosch, son of Dr. Leopold Damrosch, succeeded him as conductor, and Frank Damrosch, another son, was conductor from 1898 to 1912, when Louis Koemmenich assumed control. Frank Damrosch is also conductor of the Musical Art Society, devoted to the performance of older church music, and the People's Choral Union of 2,000 voices drawn from the laboring classes. The organization has three classes of members — those constituting the elementary class, the advanced class and the choral union proper. Any self-supporting man or woman may join the elementary class, where thorough instruction as to the proper use of the voice and the rudiments of music is given. From this class the pupils are promoted to the advanced class, whence upon graduation they pass to the choral union. The attendance at the various classes numbers about 2,500, 450 and 1,200 respectively. Meetings are held every Sunday, and once, in May, a public concert is given. Another important New York society, the Arion, was founded in 1854. Its membership is about 1,200.

Philadelphia has had several notable choral societies, the Handel and Haydn, the Beethoven, the Cecilian and the Philadelphia Chorus, conducted by Henry G. Thunder, Michael H. Cross, Chas. M. Schmitz and W. W. Gilchrist. These have all passed away, but in their stead is a new and vigorous chorus of 300 voices, founded in 1897 and conducted by Henry Gordon Thunder, son of Henry G. Thunder.

In Baltimore the Oratorio Society under Pache, and in Washington the Choral Society

under Kaspar, are presenting standard works in an adequate manner.

In the West the German element of the population forms male choruses. But there is no lack of mixed choruses, which meet yearly for a great singing festival. In making these festivals a means for the spreading of musical culture and intelligence, Theodore Thomas and Frank van der Stucken were indefatigable.

In Chicago the Apollo Club (1872) under Harrison M. Wild, and in Saint Louis the Choral Symphony Society (1870) under Ernst, are bending public taste toward the great choral works.

While the giving of music festivals involves the forming of a large chorus in conjunction with orchestra and soloists, it does not appear that such bodies of voices are appropriately styled choral societies in the strict sense; hence only passing mention is here made of the Springfield, Worcester and Cincinnati festivals, all of which have large and efficient choruses conducted by Chadwick, Goodrich and Theodore Thomas.

A difference, however, must be made between these choruses and the Bach Choir of Bethlehem, Pa. This unique organization of about 100 voices under the direction of J. Fred Wolle has devoted itself to the presentation of the works of John Sebastian Bach, and in the remarkable series of festivals held since 1900 it has succeeded in achieving a national reputation for itself. It produced the great Mass in B minor for the first time in America, besides giving the Matthew Passion, the Christmas Oratorio and other works in a most impressive manner. To some extent this was no doubt due to the unusual and reverential surroundings, the old Moravian town, the venerable church in which the performances were held, the announcement of the performance by a choir of trombones in the belfry. All these details no doubt helped greatly to create an atmosphere of simplicity and sincerity that affected the audiences that gathered from far and wide, but the real effect was the chorus work, which was done with an earnestness and devotion that were most impressive and caused the often inadequate solo and orchestra work to be forgotten.

CHORALE. See CHORAL; CHORAL SOCIETIES; MUSIC; GREGORIAN CHANT.

CHORAZIN, kō-rā'zĭn, Palestine, one of the cities in which Christ's mighty works were done, but named only in his denunciation (Matt. xi, 21; Luke x, 13). It was known to Saint Jerome, who describes it as on the shore of the lake, two miles from Capernaum. Robinson locates it at the modern Tell Hūm, three miles northeast of Capernaum, but this location is doubtful. Though the town was evidently of some importance, judging from the extensive ruins to be seen there, it has received little or no attention in ancient writings, the only mention of it being in the New Testament. It has been identified with the modern Kerazeh.

CHORD (from the Greek word *chordē*, a string of gut). 1. *In music,* the simultaneous and harmonious union of different sounds, at first intuitively recognized by the ear, and afterward reduced to a science by the invention of the laws or rules of harmony. Chords may consist of from two to five parts. Absolute chords of two parts are produced only by thirds or sevenths. Chords of more than two parts are either fundamental chords or inversions of them and are divided into concords and discords. The union of sounds in all chords will be found, on analyzing their component parts, to be an admixture of major and minor thirds. The common chord of *Trais harmonica perfecta* is the basis of all harmony and consists of a base note or prime, with its third and fifth above. These three sounds are the distance of a third from each other. When the lowest third is the greater third, as above, the chord is a major chord; but when the lowest third is the lesser, the chord is called a minor chord. A chord of two minor thirds combined is called diminished, as the interval from the lowest note to the highest is less than a perfect fifth; the common chord admits of two inversions, according as one or other of its notes is made the base, or lowest note of the chord.

By adding another third above the common chord, a chord of four parts is produced, which is called the chord of the seventh, because the highest note is a seventh above the base. When the chord of the seventh is produced on the fifth of the scale it is then called the dominant seventh, which is the most perfect species of the chord. It then consists of a major third, perfect fifth and seventh, the minor, which is the next harmonic produced by nature above the fifth. The chord of the seventh may be formed also on any of the notes of the major or minor scale taken as a bass note, which produces the varieties of major, minor and diminished seventh. The chord of the seventh admits of three inversions, according as the notes above the fundamental note are used as bass notes. From its nature it requires a resolution and is therefore always followed by a common chord, whose fundamental bass is a fifth below that of the seventh.

2. *In geometry,* a chord is the straight line which joins the two extremities of the arc of a curve; so called from the resemblance which the arc and chord together have to a bow and its string, the chord representing the string. The chord of a circular arc is obtained by multiplying the radius by twice the sine of half the angle which the arc subtends at the centre.

CHORDATA, kôr-dā'ta, the most advanced in development of the phyla, or branches, of the animal kingdom, the phylum which is characterized by the presence of a notochord (q.v.) and in its higher classes by the presence of a backbone and spinal cord. It includes all the vertebrates (mammals, birds, amphibians, reptiles and fishes), and also *Amphioxus,* the ascidians, and *Balanoglossus.* Compare ADELOCHORDA.

CHOREA, or **SAINT VITUS' DANCE,** is a disease of the central nervous system characterized by disturbances of spontaneous and co-ordinating movements. It occurs usually in the later years of childhood or less frequently the earlier years of adolescence and is more common in girls than in boys. The motor symptoms vary from slight unrest and irritability to marked disturbances. In mild cases the choreic movements are limited to the face and to single muscles, in more severe ones the entire body musculature may be involved. The movements in the incipient stage are often scarcely noticed. There are at first slight,

irregular, jerky movements with a tendency to drop articles, due to a relaxation of grasp occurring simultaneously with the muscular jerk. There are also premonitory symptoms of listlessness, depression, nervous irritability, loss of appetite and sometimes anæmia. Psychic manifestations may accompany the development of the chorea in the form of night terrors, transitory hallucinations, all of which are only temporary and belong to the less severe forms. Distinct delirium, stupor and acute dementia belong only to the severer form for which the prognosis is unfavorable. The usual course of chorea is from 6 to 10 weeks, but not infrequently it extends over three or four months, or the movements may persist for many months due to the nervous condition of the child. Recurrent attacks are also frequent. All of this points to a broader view of the causation than is usually accepted. There is fundamentally present, probably, an inferior or slowly developing psychomotor-cerebellar integration, which is inadequate to the grade of motor adaptation demanded by the rapidly growing body. Chorea is therefore a fatigue symptom arising from a slight degree of infection or even from mere excess of motor activity. Rheumatic and other infections aid in reducing the physiological efficiency, but probably have not the specific etiological value that has been assigned to them. Ancestral syphilis, by interfering with the normal development of the nervous system, is a causative factor in certain choreas.

The best treatment for chorea is rest in bed during course of the active symptoms. Excitement of all kinds, play or intellectual effort should be avoided. There should be a full nourishing diet and during convalescence gentle exercise in the open air. Arsenic is of distinct value, but its administration should be very carefully supervised. Neosalvarsan may be used intravenously in some cases with advantage. In chronic chorea much can be done in overcoming the persistent motor disturbance by judicious training through passive and voluntary movements under guidance. The voluntary movements are very simple at first and gradually become more complex, thereby assisting in establishing once more freedom and precision of movement through co-ordination.

There are also habit choreas which may be hysterical imitation or may be milder forms of convulsive tics, from which, however, true chorea can be differentiated. There are also choreas appearing in adults. The most serious of these is the chorea of pregnancy. It usually occurs with the first pregnancy and may recur with succeeding pregnancies. It soon ceases after the termination of the pregnancy. (For hereditary chorea see HUNTINGTON'S DISEASE). The name Saint Vitus' Dance was acquired from a dancing mania common at one time in Germany and which was said to be cured by pilgrimages to the shrine of Saint Vitus. The name has been retained although chorea is an entirely different affection from those outbreaks of mental and physical excitement. Consult Jelliffe and White, 'Diseases of the Nervous System' (2d ed., 1917).

SMITH ELY JELLIFFE.

CHORION, kō'rĭ-on, the outermost of the membranes that surround the embryo. It is a most important structure in its developmental history as it comes into close contact with the decidua and is incorporated into the placenta, constituting the fœtal part.

CHORLEY, chor'lĭ, **Henry Fothergill,** English critic and miscellaneous writer: b. Blackley Hurst, Lancashire, 15 Dec. 1808; d. London, 16 Feb. 1872. His criticisms appeared mostly in the *Athenæum* of London, displaying fine perception and exquisite taste in matters connected with literature and music. His novels, however, 'Conti'; 'The Lion,' and 'The Prodigy' are failures from the popular point of view, although finely written; and his plays, with the exception of 'Old Love and New Fortune,' are weak.

CHORLEY, England, municipal borough and market town, in Lancashire, on the Chor, 22 miles northwest of Manchester. It consists of wide and well-built streets, and contains an ancient parish church, various other churches and chapels of modern date, together with a spacious town-hall, several large schools, clubhouses, theatres, etc. The principal manufacture is that of cotton goods, but there are also bleaching, calico-printing and dye-wood works, floor-cloth works and iron foundries. In the vicinity are coal, lead and iron mines and millstone quarries. One of the reservoirs of the Liverpool corporation waterworks is here situated, with a capacity of 48,300,000 gallons. Pop. 30,315.

CHOROID. See EYE.

CHORON, shō-rôn, **Alexandre Étienne,** French musician: b. Caen, 21 Oct. 1772; d. Paris, 29 June 1834. Besides being a talented musician he was an excellent scholar, linguist and mathematician. He labored assiduously to promote musical education in France, founding his famous "conservatoire" in 1818. He had become a music publisher in 1805, and for some years he published the works of the best masters. He composed a song entitled "La Sentinelle," which is still popular in France. His most ambitious work was his "Introduction à l'étude générale et raisonée de la musique," which, however, he did not complete. Choron wrote several instructive works on music and composed a number of church pieces. He trained many composers and singers who afterward became famous.

CHORUS, originally a special feature in the Greek drama. During the most flourishing period of Attic tragedy the chorus was a troop of male performers, wearing masks and representing male or female characters, who, during the whole representation, were spectators of the action. In the intervals of the action the chorus chanted songs relating to the subject of the performance and which were intended either to augment the impression or to express the feeling of the audience on the course of the action. Sometimes it even took a direct part in the action by observations on the conduct of the dramatic characters, by advice, consolation, exhortation or dissuasion. It usually represented a part, generally the oldest portion of the people, where the action happened, sometimes the counsellors of the king, etc. The chorus was an indispensable part of the representation. In the beginning it consisted of a great number of persons, sometimes as many

as 50; but the number of the tragic chorus was afterward limited to 15; while the chorus in comedy numbered 24. The exhibition of a chorus was in Athens an honorable civil charge, and was called choragy. (See CHORAGUS). The leader or chief of a chorus was called coryphæus, who spoke in the name of the rest when the chorus participated in the action. The chorus was often divided into two parts, who sung alternately. The divisions of the chorus were not stationary, but moved from one side of the stage to the other; from which circumstance the names of the portions of verse which they recited, *strophe, anti-strophe* and *epode,* are derived. But it cannot be determined in what manner the chorus sung. It is probable that it was in a sort of solemn recitative, and that their melodies, if we may call them so, consisted in unisons and octaves, and were very simple. They were accompanied by flutes. With the decline of ancient tragedy the chorus was omitted. Some modern tragedians, as Racine in France and Schiller in Germany, have attempted, with more or less success, to imitate or revive the Greek chorus. Shakespeare has employed devices founded on it.

Chorus, in modern music, is that part of a composite vocal performance which is executed by the whole body of the singers, in contradistinction to the solo airs and concerted pieces for selected voices. The singers themselves are also called the chorus.

CHOSE, shōz, a thing, a chattel, a piece of property; the subject-matter of an action. Chose is used in divers senses, of which the four following are the most important: Chose local, a thing annexed to a place, as a mill; chose transitory, that which is movable, and may be taken away or carried from place to place; chose in action, otherwise called chose in suspense, a thing of which a man has not the possession or actual enjoyment, but has a right to demand by action or other proceeding; chose in possession, a thing which a person has not only the right to enjoy, but also its actual enjoyment.

CHOSEN. See KOREA.

CHOSI, chō'shē, Japan, a prefectural town, on the east coast of Nippon, 72 miles by rail from Tokio, on the Tonegawa. Fish oil manufacture is the chief industry. The city contains a fine temple situated on an eminence in its centre. Pop. about 19,000.

CHOSROES, kŏs'rō-ēz, or **KHOSRU,** properly **KAI KHOSRU,** (a) a legendary Persian king, referred to by Omar Khayyam. (b) Chosroes I, king of Persia: d. 579. He succeeded to the throne in 531, and his memory is still venerated in the East, where his virtues obtained him the titles of the Magnanimous and the Just. At his accession Persia was involved in a war with Justinian, which Chosroes terminated successfully, obliging Justinian to purchase peace by the payment of a large sum of money. In 540, however, jealous of the victories of Belisarius, the great general of the empire, Chosroes violated the peace, invaded Syria, laid Antioch in ashes and returned home laden with spoils. The war continued till 562, when the emperor again purchased peace, by an annual tribute of 30,000 pieces of gold. The peace continued for 10 years, when the war was renewed with Justin, the successor of Justinian, when Chosroes was again successful. His zeal for the administration of justice sometimes led him to acts of cruelty; but he encouraged the arts, founded academies and attained considerable proficiency in philosophy himself. His reputation obtained him a visit from seven sages of Greece, who still adhered to the Pagan religion; and in a treaty with Justinian he required that they should be exempt from the penalties enacted against those who continued to favor Paganism. It was in the reign of Chosroes that the Turks first became known to Europeans, first as friends, afterward as enemies, of the Persian king.

CHOSROES II, king of Persia, grandson of the preceding: d. 628. He ascended the throne in 591, on the deposition of his father. He was assisted by the Emperor Mauricius, and on the assassination of the latter by Phocas (602) he took up arms against the empire, and refused to make peace at the solicitation of Heraclius, the succeeding emperor. By a long series of successes he raised the Persian power to the highest point, and reduced the empire to extremity. Heraclius, however, taking courage from despair, succeeded in a series of brilliant campaigns in recovering his lost provinces, 622–27. Chosroes, repeatedly defeated, was completely overthrown in the great battle of Nineveh. He fled with his favorite wife, Sira, but after witnessing the massacre of his numerous sons he was thrown into a dungeon and assassinated by command of his son Siroes.

CHOTA NAGPUR, chō'ṭa năg-poor'. See BIHAR AND ORISSA.

CHOUANS, shoo-ăn', a name given to the royalist peasantry of Brittany and Lower Maine, who carried on a petty warfare against the Republican government from an early period of the French Revolution. The name Chouan was finally extended to all the Vendeans. The name was derived from the first chief of the Chouans, Jean Cottereau, who with his three brothers organized these bands in 1792, under the inspiration of the Marquis de la Rouarie, an ardent leader of the Royalists. Cottereau was the son and grandson of persons engaged in the manufacture of wooden shoes. He had joined a band of dealers in contraband salt, and acquired the surname Chouan from the cry of the screech-owl (*chat-huant*), which he used as a signal with his companions. He was killed in an engagement with the Republican troops, 28 July 1794. After the death of Jean Cottereau, the Chouans become quite lawless, engaging in guerrilla warfare and highway robbery. About 1800 they ceased to rob and terrorize, and although an effort was made in 1815 to revive the insurrection, they were suppressed by General La Marque.

CHOUANS, The, a romance by Balzac, the novelist's first important work. The title, when it appeared in 1829, was 'The Last Chouan; or, Bretagne in 1800.' In 1846 it was rearranged in its present form. The author made a profound study of the scenery of Bretagne and the manners of its people before he wrote his romance, and his pictures of both scenery and people have the stamp of reality and truth.

CHOUSINGA, chow'sĭn-gą, a gazelle-like Indian antelope, remarkable for the fact that

the buck has four horns. See FOUR-HORNED ANTELOPE.

CHOUTEAU, shoo-tō, **Auguste,** pioneer, trader and government peace commissioner: b. New Orleans 1749; d. 24 Feb. 1829. In command of a boat, and accompanied by his young brother Pierre (afterward known as Pierre Chouteau the Elder), in August 1763, they joined the Laclede expedition to open up the fur-trade in the region west of the Mississippi. In the winter they selected a position on the western bank of the Mississippi, 61 miles above Saint Genevieve, for their principal trading post, and named this Saint Louis. Auguste had command of the party which commenced operations there, 15 Feb. 1764. Both brothers, in time, became heads of large families; acquiring wealth and a reputation which for over a century was a passport that commanded safety and hospitality among the Indians of the Northwest.

CHOUTEAU, Auguste Pierre, American fur trader and pioneer: b. Saint Louis, Mo., 9 May 1786; d. Fort Gibson, 25 Dec. 1838. He entered the United States Military Academy in 1804 and was appointed an ensign in the 2d United States Infantry, in June 1806. He served on the Southwestern frontier as an aide-de-camp on the staff of Gen. James Wilkinson for a brief term, resigning from the service in January 1807. During the following season he commanded a trading expedition up the Missouri River, which was accompanied by a military detachment, under the command of Ensign Nathaniel Pryor, which had been detailed to escort the Mandan chief, Shehaka, back to his people in Dakota. The expedition was attacked by the Arikara Indians and driven back down the river with the loss of a number of men killed and wounded. In 1809 he ascended the Missouri River to the Rocky Mountains with a trading expedition, returning the following year. During the War of 1812, when a general Indian uprising throughout the Mississippi Valley seemed imminent, he served as captain of militia. In 1815, he formed a partnership with Jules de Mun for the purpose of engaging in the Indian trade in the upper valleys of the Arkansas and Platte rivers. The expedition met with disaster, first having to fight the Comanche Indians, at a place always afterward known as Chouteau's Island in the Arkansas River, and subsequently being imprisoned by the Spanish authorities at Santa Fé, where their goods were confiscated, and whence they were expelled. About 1819 or 1820, Auguste P. Chouteau took charge of the Chouteau trading post on the Grand, or Neosho, River, where he made his home during the rest of his life, and where he entertained Irving and Latrobe en route to their "tour on the prairies," in 1832. At that time he also had another trading post near the lower falls of the Verdigris River, to which Irving referred as the Osage Agency. In 1834, he accompanied the Leavenworth-Dodge expedition to the Red River country to visit the Wichita, Kiowa and Comanche tribes of Indians. In 1835 he established another trading post at Camp Holmes, on the Canadian River. Two years later he transferred the business of this post to a new one which was built near the present town of Lexington, Okla. He served as a commissioner in negotiating a treaty with the Wichita and other tribes of Indians in council at Camp Holmes that same year. Consult Latrobe, Charles J., 'The Rambler in North America in 1832 and 1833'; James, 'Three Years among the Indians and Mexicans' (Missouri Historical Society, edited by Walter B. Douglas 1916); Mooney, James, 'Calendar History of the Kiowa' (17th Annual Report, Bureau of American Ethnology, part 2, pp. 170–72); Catlin, George, 'Letters and Notes on the Manners, Customs and Condition of the American Indians'; Gregg, Josiah, 'Commerce of the Prairies.'

CHOUTEAU, Pierre, THE ELDER, pioneer, trader and one of the founders of the city of Saint Louis: b. New Orleans 1759; d. 9 July 1849. He was a brother of AUGUSTE CHOUTEAU (q.v.) whose business travels and enterprises he shared. He was father of AUGUSTE PIERRE CHOUTEAU (q.v.) and of CHOUTEAU, Pierre, 2d; b. Saint Louis, 19 Jan. 1789; d. 8 Sept. 1865. Early engaged in business with his father and uncle he became a leading merchant in the fur-trade in Saint Louis; and a principal or head of most of the companies successively formed for conducting this business. In 1834, with Messrs. Pratte and Cabanne, he purchased the interest of John Jacob Astor in the American Fur Company, and in 1839 formed the house of P. Chouteau, Jr. & Co., which almost monopolized the fur trade of the West and Northwest.

CHOUTEAU, Pierre, Jr., American fur trader, son of the preceding: b. Saint Louis, 19 Jan. 1789; d. Saint Louis, 8 Sept. 1865. He worked for his father and began trading in fur early in life. After establishing posts for the sale of skins throughout the trans-Mississippi region he purchased the fur-trading interests of John Jacob Astor.

CHOW-CHOW, a Chinese or pidgin English word meaning chopped up or broken and mixed. It is applied to a confection of mixed fruits made in China; to a mustard pickle of assorted ingredients made in India; and in the United States and Great Britain to a similar pickle usually compounded of chopped cabbage, green tomatoes, green or red peppers, spices, vinegar, mustard-seed, cucumbers, etc.

CHOWCHOW, a diminutive breed of Siberian sledge-dogs, improved and developed in China, whence they began to be imported into Europe and America at the beginning of the 20th century. These dogs have the form and coat of their more useful progenitors, and are very compact and sturdy of frame, and lively in disposition. The tail is carried tightly curled over the back. In color they are either all black, even to the tongue and inside of the mouth, or all white, blue, red or yellow. This breed was not recognized in American bench-shows until 1902.

CHOWDER (French *chaudière,* "a kettle"), a dish of French origin, composed chiefly of vegetables, pork and fish or shell-fish, boiled together. Perhaps the most common form of chowder is that made from clams, either from the soft-shelled variety or the hard-shelled round clam or quahog. Chowder is a favorite dish on the New England coast and among the Newfoundland fishermen. A fish chowder is made as follows: Salt pork cut into small strips or dice is cooked for a few minutes in a deep

iron kettle. Sliced or chopped onions are slightly browned in the pork fat, and onions and pork are then removed. A layer of sliced potatoes is laid in the kettle, then a layer of fish (small ones entire or large fish in slices), a layer of salt pork, one of onions, and so on alternately to the requisite amount. The fried salt pork and onions are also distributed through the mass, which should be seasoned throughout with salt, pepper, thyme and savory. A very common ingredient is ship-bread or other hard crackers laid in between the other layers. A small quantity of water or of milk, or of both, is poured into the kettle, and the whole is boiled, without stirring, until cooked through. In adding the water or milk it must be remembered that chowder is a stew,—not a soup. Foreign cooks make a soup of clams, potatoes, onions and tomatoes, which passes under the name of clam chowder. Genuine chowder is never disturbed until it is served, and in camps is portioned out in layers, direct from the kettle.

CHOWN, Samuel Dwight, Canadian clergyman: b. 11 April 1853. He was educated at King's Grammar School and Victoria University; ordained to the Wesleyan Ministry in 1879; was secretary of the social reform committee of the Methodist Church in Canada, 1902–10; associate general superintendent, 1910–14, when he was elected general superintendent.

CHRESTIEN DE TROYES, krā-tē-ĕn dė trwä, French *trouvère* (troubadour): b. Troyes about 1150; d. about the end of the 12th or beginning of the 13th century. He translated Ovid's 'Ars Amandi' into French, and probably wrote some works based on the classics, but his fame rests upon the still extant romances of Arthur and the Knights of the Round Table, the materials for which were obtained from Geoffrey of Monmouth's rather credulous 'History of Britain.' They are entitled 'Iric et Guide'; 'Percival le Gallois'; 'Le Chevalier au lion'; 'Cliget'; 'Chevalier de la table ronde'; 'Lancelot du Lac'; and 'Guillaume d'Angleterre'; but the authorship of the last named is doubtful. Two others of his works, 'Tristan, ou le roi Marc et la reine Yseult' and 'Le Chevalier à l'épée,' have been apparently lost. His language and versification were models for troubadours and romancers for a long time; and from him the Arthurian poets to the end of the 13th century borrowed episodes, themes, situations, characters and all manner of poet's devices. Chrestien was a master of invention, fashioned for himself a competent literary vehicle and made most effective use of his large knowledge of men and manners. Consult Förster, 'Christian von Troyes sämmtliche erhaltene Werke' (1884).

CHRIEMHILD, krēm-hilt. See NIBELUNGENLIED.

CHRISM, a mixture of olive oil with balm (*opobalsamum*), which, being blessed by the bishop, is used in the Roman Catholic Church in the administration of the sacraments of baptism, confirmation, holy orders and extreme unction, and in certain rites; as in consecrating the instruments of the divine service, such as sacred vessels, church edifices, altar stones. The chrism of the Greek Church is compounded of olive oil and a great variety of spices. In the Roman Catholic Church the holy oils are blessed by the bishop on the Thursday of Holy Week.

CHRISOM, krĭz'ŏm, the name of the white linen cloth laid by the priest on the child in Roman Catholic baptism, to signify its innocence. By olden usage it was generally presented by the mother as an offering to the Church, but if the child died before the mother was churched, it was used as a shroud. By a common abuse of words, Chrisom came to mean the child itself, being first applied in the old bills of mortality to denote such children as died within the month of birth.

CHRIST, Wilhelm von, German philologist: b. Geisenheim 1831; d. 1906. After 1861 he was professor at the University of Munich. He published numerous works including 'Die metrische Ueberlieferung der Pindarischen Oden' (1868); 'Metrik der Griechen und Römer' (Leipzig 1879); 'Attikusausgabe des Demosthenes' (1882); 'Griechische Litteraturgeschichte' (latest ed., 1904); editions of the 'Iliad' (1884); Pindar (1887) and the 'Poetics' and 'Metaphysics' of Aristotle (1895).

CHRIST (Greek *Christos,* the anointed; *Messiah,* from the Hebrew, has the same signification). See CHRISTIANITY; JESUS.

CHRIST, or CRISS-CROSS ROW. See HORNBOOK.

CHRIST, Disciples of, a denomination of Christians in the United States commonly known as the Christian Church, or Church of Christ, and sometimes called Campbellites. Among the Protestant bodies of America they rank fifth in number. Their strength is greatest in the Ohio and Mississippi Valley States. In September 1809, Thomas Campbell, a Scotch minister of the seceders' branch of the Presbyterian Church, then living in western Pennsylvania, issued a "Declaration and Address," deploring the divided state of the Church, and urging as the only remedy a complete restoration of apostolic Christianity and the rejection of all human creeds and confessions of faith. The Christian Association of Washington, Pa., was formed for the purpose of promoting the principles set forth in this declaration. Mr. Campbell's son, Alexander, just from Glasgow University, Scotland, at once gave his splendid ability and learning to this new movement. It was not the intention of the Campbells to form a distinct religious body, but to effect the proposed reforms in the churches. Their plea was so opposed that they were compelled to act independently, and the first church in the new movement was organized at Brush Run on 4 May 1811. The Disciples maintained that having accepted the Bible as their only rule of faith and practice, and the only divine basis for the union of all Christians, they were led to reject infant baptism and adopt believers' immersion only. They observe the Lord's Supper each first day of the week, and heartily and practically accept and exalt the doctrine of the divinity of Christ. Their church policy is congregational, and they have no distinction of clergy and laity and recognize the local church with its elders and deacons as the highest ecclesiastical authority though they frequently hold conventions in the interest of world-wide missions and benevolent work, but not for legislative purposes. In recent years the Disciples

of Christ have made great advance in numbers and along all lines of religious activity, until their statistics for 1916 show 14,184 ministers, 17,236 churches and 2,283,003 communicants. They report about 10,000 Bible schools, with an enrolment of about 900,000 children. They raised $1,503,716 for missions, home and foreign, in 1915, and about $150,000 for other purposes. Among the several universities and colleges of high rank controlled by the Church are Drake University, Des Moines, Ruth College, Indianapolis, Hiram College, Ohio, and Valparaiso University, Indiana.

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CHRIST, Order of the Knights of, an order instituted in 1317 by King Diniz of Portugal "for the defense of the faith, the confusion of the Moors, and the extension of the Portuguese monarchy." It was modeled on the Spanish orders of the Alcántara and Calatrava and adopted the regulations of the Cistercians. The property from the suppressed Templars was given it as endowment. Papal approbation was secured with difficulty. The knights joined in several Crusades and received great additions to their own possessions and in time the order became so rich and powerful as to excite the jealousy of the Portuguese monarchs. Subsequently their possessions were transferred to the Crown as were the offices of administrator and grand master. The headquarters of the order was the castle of Thomar, 70 miles northeast of Lisbon. John III, in 1523, made the order a monastic one. It was secularized in 1797 and afterward became a mere honorary order. In 1823 it was extended to Brazil, but was dissolved there after the fall of the empire in 1889.

CHRIST, Papal Order of, a branch of the Portuguese order instituted for Italians by Pope John XXII (1316–34). It later became merely an honorary order.

CHRIST IN ART. The representations of the person of the Saviour which for a succession of ages have constituted one of the most important subjects of Christian art, and have occupied the highest genius of Christendom, are all ideal. The attempt to represent the personal appearance of the Saviour can hardly be traced back further than the age of Constantine. The origin of Christian art, indeed, has been traced to the catacombs of Rome, and is not to be considered as springing directly from Pagan art, although the great Italian masters of the Middle Ages may have derived much instruction from classical models; but the painting and sculpture of the early Christians were chiefly allegorical, representing the moral of the gospel parables or similar symbolic representations of Christian doctrine, without regard to historical accuracy of portraiture. At a later period legends arose of various likenesses of the Saviour having been preserved by miraculous means. For example, King Abgarus of Edessa had a napkin sent him by the Saviour himself, in which he had caused his likeness to be miraculously impressed by placing his face in it. A portrait is said to have been similarly impressed on a handkerchief of Saint Veronica, and Saint Luke is said to have taken one himself. An apocryphal letter of Lentulus, the predecessor of Pilate, addressed to the Roman Senate, contains a description of the person of Jesus. One of the earliest professed portraits of the Saviour is in the Calixtine Catacomb near Rome. He is represented with the hair parted on the forehead, and falling over the shoulders in long waving locks. In regard to this common representation it may be observed that when Saint Paul wrote his first epistle to the Corinthians there were probably many Christians scattered over the world who remembered the personal appearance of the Saviour, and if this representation of it had been correct he would hardly have written to a Christian church that it was contrary to nature and a shame for a man to have long hair. The great painters of the Middle Ages, to whom we owe the ideal representation of Christ, probably founded somewhat upon these early notions. A Christ of the 4th century with an oval face, Oriental features, parted hair and a short straight beard is said to have been the model for the Byzantine and Italian painters till the time of Michelangelo and Raphael. Consult Jameson, Mrs., 'History of Our Lord, as Exemplified in Works of Art' (2 vols., London 1883); Kraus, 'History of Christian Art' (Freiburg 1903).

CHRIST CHURCH, College of, a notable institution in Oxford, England. In 1526 Wolsey obtained from Clement VII a bull for the suppression of 22 monasteries, the site of one of which he chose for a new college, to be called Cardinal College, and which he intended to endow beyond that of any other in Oxford. On the fall of Wolsey, in 1529, the establishment came into the hands of King Henry VIII. In 1532 that prince founded it under the name of King Henry VIII's College, and in 1546 he once more re-established the college under the name of "Christ Church Cathedral in Oxford, or the Foundation of King Henry VIII, with a dean and eight canons, 100 students, 40 schoolboys, clerks, choristers," etc. The foundation is now subsisting, though it has undergone considerable modifications. According to the present statutes, which came into force in 1882, the students, who are equivalent to fellows, are divided into two classes, and are in number about 30, besides honorary students. There is also a body of scholars, about 60 in number, some of whom are elected annually from Westminster School, while others are chosen by open competition for proficiency in mathematics, physical science or history. The students are appointed in the first instance for two years, but this term may be prolonged. There are also 29 exhibitioners, besides six chaplains, the whole forming the largest collegiate establishment in Oxford. The modern spirit of reform was introduced by one of the most famous deans of

the college, Dean Liddell (1855–91), who was also responsible for the restoration of and additions to the college buildings. In 1913 it had 326 undergraduates. The buildings about the great quadrangle include the cathedral, and the Hall, with the exception of the Hall of William Rufus at Westminster, the most splendid example of its kind in England. Christ Church is one of the foremost colleges in Oxford and has always been famous for its distinguished members. Among these may be mentioned five Prime Ministers of England in the 19th century — Canning, Peel, Gladstone, Salisbury and Rosebery. Through it have passed Lyttleton, Mansfield, John Locke, William Penn, Ben Jonson, Camden, Sir Philip Sidney, John and Charles Wesley, Dr. Pusey and John Ruskin. Consult Thompson, H. L., 'Christ Church' (London 1900).

CHRISTABEL. Coleridge's 'Christabel,' though a fragment, is among all his works second in fame only to the 'Ancient Mariner' (q.v.). The first part was written in 1797, the second in 1800; and between them and the date of its publication in 1816 — a delay due largely to Coleridge's uncertain ways — Sir Walter Scott, Charles Lamb, Wordsworth, Southey and many other people of taste and authority had become familiar admirers of the poem. Except for a certain disappointing harshness in the reviews of the day, this success was repeated in a wider public for the printed form, and may be said still to hold.

'Christabel' for us, then, remains a fragment of a long narrative poem. The second canto leaves off with the baron's anger at his daughter's jealousy and his dispatching Tracy, the bard, to Lord Roland's castle at Tryermaine. It is a common opinion that Coleridge never told how the poem was to end. But in Gillman's 'Life' (p. 301) is supplied an account of Coleridge's plans for its completion in a third and fourth canto, by making the supernatural being change from Geraldine to Christabel's absent lover. 'Christabel' is revolted without knowing why — by the suit paid her; but finally yields to her father's entreaties and is led to the altar. The real lover returns just in time with the ring token. The supernatural being disappears, the bell tolls and the mother's voice is heard, and with joy the marriage and the reconciliations take place.

The metrical beauty of 'Christabel' is one of its greatest claims. It is based on the principle of accent, rather than syllable counting. There are four accents to the line, with a variation in syllables as the poetic necessity and passion itself may vary. With so delicate an instrument as this, Coleridge shows himself easily to be one of the great masters of English verse.

The main idea of 'Christabel' is that the virtuous people of this world may save the wicked; may have a power deeper far than the power of evil. Around this idea Coleridge weaves the story; with the framework of popular romance and legend; the pure maiden, the mother's love; the natural — supernatural effect, to use his own phrase; the innumerable lovely cadences; the half-magical imagery; the enchantments; the poignant and lyrical beauty everywhere evident.

STARK YOUNG,
Professor of English, Amherst College.

CHRISTADELPHIANS, "brothers of Christ," a small body of Christians, owning John Thomas, M.D., an Englishman, as their founder. He came to this country in 1832, and was for a time connected with the Disciples of Christ; in 1834 he declared opposition to the doctrines of that body concerning baptism, and other subjects. He announced his belief that the existing churches were apostate and began to form societies which held with him to the Bible as the only rule of faith and practice and to the idea of restoration of primitive Christianity. Several years later, the distinctive name of Christadelphians was adopted. This was in the early years of the 6th decade of the 19th century. Christadelphians do not hold to the ordinary view of the Trinity, believing that the Holy Spirit is not a person but an effluence of divine power. They are premillennialists, believing that Christ will come and set up his kingdom in Palestine, and that at the end of the thousand years the righteous will receive the reward of eternal life and the wicked will be sentenced to eternal death. They baptize by immersion and govern their churches by the congregational system. They have no conferences or associations but hold "fraternal gatherings." There is no ordained ministry. They have 70 societies, or churches, and 1,500 members, an increase of less than 90 in the past 10 years. They are scattered over 24 States. *The Christadelphian Advocate*, Waterloo, Iowa, is their organ. Consult 'Dr. Thomas, His Life and Work' (Birmingham 1880), and 'Who are the Christadelphians?' (1869).

CHRISTCHURCH, England, a parliamentary and municipal borough in Hampshire, situated at the confluence of the Avon and Stour, about one mile from the sea. It is famous for its great priory church, dating in part from the early part of the 12th century. The church is over 300 feet long and contains a magnificent altar-screen. The famous south coast health resort, Bournemouth, is included in the borough. Pop. 5,104.

CHRISTCHURCH, New Zealand, town, capital of the province of Canterbury, and the see of the primate of New Zealand, situated on the Avon River, seven miles from the sea, and is the terminus of the Great Northern and Southern Railway. A railway tunneled through the Lyttleton Hills connects it with Lyttleton, the nearest port. It was founded by the Canterbury Association, a colonizing body of Anglican churchmen formed in 1850, and its streets were given the names of English dioceses. It is one of the two chief centres of the Middle Island. Socially it is one of the principal towns of New Zealand. Its seaside resort, New Brighton, is famous throughout the island. It contains a number of handsome buildings, including a fine cathedral, the government offices, Saint Michael's Church, the Supreme Court, museum, library and college, and has a flourishing trade and manufactures. Pop. 80,193.

CHRISTEN, krē'stĕn, **Ada.** See BREDEN, CHRISTINE.

CHRISTIAN I, king of Denmark and Norway: b. 1426; d. Copenhagen, 21 May 1481. He reigned from 1448 to 1481, and in 1479 founded the University of Denmark.

CHRISTIAN II, king of Denmark, Norway and Sweden: b. Nyborg, Fünen, 2 July

1481; d. Kallundborg, Zealand, 25 Jan. 1559. He was grandson of Christian I. In 1501 he was named successor to the crown and took part in the government of Norway, which he conducted with great severity. On his accession to the throne in 1513 he signed a capitulation in favor of the privileges of the lay and clerical aristocracy in his dominions, including the independent administration of justice; but all his efforts were bent toward strengthening the royal power, particularly in Sweden, which refused to acknowledge him. To strengthen himself against Steen Sture, the administrator of Sweden, who had set himself in opposition to the union of Calmar formed in 1397 between Norway, Sweden and Denmark, he married Isabella, sister of Charles V of Germany, in 1515. He had already a mistress called Dyveke, the daughter of a Dutch woman who kept an inn in Bergen, Norway. She exercised a great influence over the King, and by her liberal spirit and knowledge of the institutions of Holland tended greatly to improve the administration of his government. She became a sort of prime minister and had great influence in originating those wise laws which gained for this king the love of his subjects. But she incurred the hatred of the nobility, and in 1517 died of poison. Soon after war broke out with Sweden, and making all the preparations and alliances in his power, Christian sent an army into Sweden commanded by Otto Krumpen, who defeated the Swedes in the decisive battle of Bogesund (Ulrikehamn), 19 Jan. 1520, in which Steen Sture, the administrator, was killed. Stockholm, under the command of the widow of Sture, stood a siege of four months, and on 4 November, Christian was crowned king of Sweden.

Subsequently Sweden revolted under Gustavus Vasa, who had expelled the Danish garrisons and been proclaimed administrator. To find the means of defense Christian convoked the Diet toward the close of 1522. Instead of attending it the nobles and prelates assembled at Viborg in Jutland, proclaimed the deposition of Christian, and called his uncle, Frederick, to the throne. Christian fled to the Netherlands to claim the succor of his brother-in-law, Charles V. Gustavus, already master of Sweden, put an end to the union of Calmar in 1523, and was proclaimed king. Christian remained nine years in exile without obtaining aid from Charles, and then visited England and Germany and adopted the Reformed faith. At length, with the assistance of Charles, he equipped a fleet in Holland, landed in Norway in 1531 and was proclaimed king by the Norwegian Diet, which had refused to recognize Frederick. The commander of the Danish fleet, a bishop, having offered him a safe conduct, he repaired to Copenhagen to negotiate with Frederick, who disavowed the admiral and retained him prisoner. He was confined for 12 years in the Castle of Sonderborg, island of Alsen, in a dungeon of which the door was walled up, the only access being by the window, and his only attendant a Norwegian dwarf. In 1544 Christian III somewhat relaxed the rigor of his confinement, and in 1549, on renouncing his right to the crown, he was permitted to reside in the Castle of Kallundborg in Zealand, where he was subjected to a less severe surveillance, until his death in 1559. His misfortunes were chiefly due to the enmity excited by his reforms and his violation of the capitulation entered into at his coronation. Consult Behrmann, 'Kong Christiern II, Historie' (1815).

CHRISTIAN III, king of Denmark and Norway: b. 1502; d. Kolding, Denmark, 1 Jan. 1559. He succeeded his father, Frederick I, and introduced the Reformed faith into Norway and Denmark. In his reign Norway was reduced to the status of a province.

CHRISTIAN IV, king of Denmark: b. Frederiksborg, Zealand, 12 April 1577; d. Copenhagen, 28 Feb. 1648. He was the son of Frederick II and succeeded to the throne as a minor in 1588. He early gave numerous proofs of a sincere love of religion and justice and a high esteem for science and art. He made his celebrated voyage to the North Cape to learn the boundaries of his kingdom and protect the rights of his subjects in that remote region from any foreign interference with their coasting trade. He was afterward, in consequence of the claims advanced by Sweden to Lapland, engaged in what is called the Calmar War with Charles IX and his successor, Adolphus, and terminated it by an advantageous peace, in which he stipulated for the free navigation of the Baltic. In the Thirty Years' War he was beaten by Tilly at Lutteram-Barenberge in 1626, but afterward, in conjunction with Gustavus Adolphus, obtained the Treaty of Lübeck 1629. He has the merit of having laid the foundation of the Danish navy, extended the trade of his subjects to the East Indies, introduced a judicious system of finance and fitted out several expeditions for the discovery of a northwest passage. He founded Christiania, the capital of Norway, which was named after him. He was succeeded by his son, Frederick III.

CHRISTIAN V, king of Denmark and Norway: b. 15 April 1646; d. Copenhagen, 25 Aug. 1699. He succeeded his father, Frederick III, in 1670, and carried on a long and fruitless war against Sweden.

CHRISTIAN VI, king of Denmark and Norway: b. 30 Nov. 1699; d. 6 Aug. 1746. He succeeded his father, Frederick IV, in 1730.

CHRISTIAN VII, king of Denmark and Norway: b. Copenhagen, 29 Jan. 1749; d. Rendsburg, Holstein, 13 March 1808. He was the son of Frederick V, whom he succeeded in 1766. In the same year he married Caroline Matilda, sister of the British monarch, George III. He afterward traveled for three years in England, Germany, Holland and France and became a member of several learned academies. Youthful indulgences, however, had weakened his intellect and obliged him to confide the charge of public business to his ministers, and more especially, it is said, to his favorite physician, Struensee, who, though he had gained the affections of Christian and his young bride, was very unpopular as a statesman, and made innovations which provoked the hostility both of the nobility and the army. Notwithstanding the unfortunate circumstances of Christian's reign, several important improvements took place under it. Serfdom was abolished in the duchies, trade and commerce promoted, the Schleswig-Holstein Canal constructed and excellent roads formed throughout the kingdom.

Christian was succeeded by his son, Frederick VI.

CHRISTIAN VIII, king of Denmark, and Duke of Schleswig-Holstein and Lauenburg: b. Copenhagen, 18 Sept. 1786; d. there, 20 Jan. 1848. He was chosen king of Norway in 1814, but, unable to hold it against Bernadotte, he abdicated in October of the same year. His reign was comparatively unimportant, the most notable event being the King's proclamation in 1846 that Schleswig and Holstein were inseparably united to Denmark. He was succeeded by his son, Frederick VII.

CHRISTIAN IX, king of Denmark: b. 18 April 1818; d. Copenhagen, 29 Jan. 1906. He was the fourth son of the Duke of Schleswig-Holstein-Sonderburg-Glücksburg and succeeded Frederick VII on 15 Nov. 1863. On his accession he quickly encountered difficulties. The son of the Duke of Augustenburg laid claim to the duchies of Schleswig and Holstein, although his father's rights had been bought out in 1852. The intervention of Prussia and Austria (1864) wrested the duchies from Denmark after a short war and Christian was compelled to renounce all his rights over them. Two years later Prussia and Austria quarreled over the spoil; after a short struggle Austria and Hanover were defeated and the latter annexed by Prussia. The remaining 40 years of Christian's reign were uneventful except for the continual turmoil of domestic politics. But if the country over which he ruled was small and comparatively unimportant, the members of his family certainly filled exalted positions. He married, in 1842, Princess Louise (1817–98), daughter of the Landgrave William of Hesse-Cassel. Of the six children of the union one son became king of Denmark (Frederick VIII); another king of Greece (George I); one daughter was empress of Russia and is the mother of the deposed Tsar, Nicholas II, while the other daughter is the dowager Queen Alexandra, mother of King George V of Great Britain. His grandson is the king of Norway, Haakon VII. Christian IX was a true constitutional ruler, democratic and modest to a degree rarely found among royalty.

CHRISTIAN X, Carl Frederick Albert Alexander Vilhelm, king of Denmark: b. Charlottenlund, 26 Sept. 1870. He is the son of King Frederick VIII and Queen Louisa. He was married 26 April 1898 to Princess Alexandrine of Mecklenburg and succeeded to the throne on the death of his father, 14 May 1912.

CHRISTIAN I, German prelate, Imperial chancellor, diplomat and soldier, one of the most picturesque figures of the Middle Ages: d. Tusculum, Italy, 25 Aug. 1183. He was made archbishop of Mainz in 1165. He was chiefly celebrated for his military exploits under Frederick Barbarossa, for whom he opened the way to Italy. He died of fever after scaring a hostile Roman army away from the walls of Tusculum, whither he had gone in response to an appeal for help from Pope Lucius III. A contemporary described Christian as a mighty, powerful man, mounted on a heavy horse. Over his shirt of mail he wore a hyacinth-colored tunic; a gilt steel helmet on his head, and was armed with a ponderous battle mace. In this guise he once fought and laid out nine armed opponents single-handed.

CHRISTIAN, Prince, of Schleswig-Holstein, uncle of King George V: b. Augustenburg, Isle of Alsen, 22 Jan. 1831; d. London, 29 Oct. 1917. He was the son of Duke Christian August, who in 1848 placed himself at the head of his adherents to resist by force the claims of Denmark upon the duchies. Father and son narrowly escaped capture by the Danes at the time. The Duke hurried to Berlin to beg the intervention of Prussia. Prince Christian, then 17, joined the newly-constituted Schleswig-Holstein army with his elder brother, Frederick. They were defeated at the battle of Idstedt and he finally had to seek a new home. The death of the Danish King Frederick VII in 1863 reopened the Schleswig-Holstein question. But Bismarck had long kept the annexation of the duchies in mind, a policy he carried out by war in 1864. Prince Christian came to England in 1865 and in the following year he married Princess Helena, third daughter of Queen Victoria. He was created "Royal Highness" by order of the Queen, and with his wife settled down as an English country gentleman. His eldest son died in the South African War (1900); the surviving son, Prince Albert, is an officer in the British army. Of his two daughters, one is married to a German, Prince Aribert of Anhalt. See SCHLESWIG-HOLSTEIN.

CHRISTIAN, Edward, English jurist: b. London 1774; d. Cambridge 1823. He was chief justice of the Isle of Ely and Downing professor of law, Cambridge (1800–23). He was the author of various works, among which are treatises on the bankruptcy laws and on the game laws. He also edited an edition of Blackstone, to which he added numerous notes.

CHRISTIAN, The, a novel by Hall Caine, published in 1897. For the most part the scene is laid in the London of to-day. The details of London life are spectacular, and the object of the book seems to be to show the inadequacy of London churches to save the city. A novel by Miss Marie Corelli is entitled 'The Master Christian.'

CHRISTIAN ARCHÆOLOGY, that department of archæological science which, through the study of inscriptions, monuments, frescoes, household and ecclesiastical utensils, seeks to throw light upon the ideas, customs and events of the early Christian communities. It may be said to have a beginning in the days of peace following the Diocletian persecutions. The Acts of the Martyrs were collected and critically examined, but in the 5th century the reading of some of these Acts was forbidden in the Roman Church by Pope Gelasius because of the mixture of legend and fact they contained. The Acts written between the 8th and 10th centuries have very little critical value, although they contain an element of truth, as the name of the martyr, the date of his death, the name of the judge of the trial, above all his place of burial, for the Catacombs were still visited. Le Blant, in his 'Supplement to the Acta Sincera Martyrum of Ruinart,' has shown how it is possible to separate the facts in these Acts from their setting of rhetoric and legend.

From very early times it was the custom to mark in the local calendar the Church feasts celebrated each year. Each church had its own calendar. The most ancient that have

come down to us are those of Rome, Tours and Carthage. Later, calendars of the principal churches were united and called martyrologies. The 'Martyrology of Jerome,' made in Italy about the middle of the 5th century and revised at Auxerre, in France, toward the end of the 6th century, is the source from which are derived existing manuscripts. Other martyrologies are those of Saint Bede, in the 8th century, of Rabanus Maurus, of Adon, bishop of Vienne, in the 9th century, and of Usuard, compiled about the year 875. The Roman Martyrology was revised by Cardinal Baronius in 1598.

In addition to the martyrologies there is also the 'Liberian Calendar,' so called from Pope Liberius, in whose pontificate it was compiled. It contains a list of the Roman consuls and the Roman prefects from 254 to 354, the epoch of Pope Liberius, the date of the death of the bishops of Rome during the same period and also the date of the death of many martyrs, together with the names of the places where they suffered martyrdom and where they were buried. It also mentions the principal feasts of the Roman Church: Christmas, Easter, the Chair of Peter and some of the more solemn feasts of the martyrs.

The 'Book of the Popes' ('Liber Pontificalis') is a collection of biographies of the Popes from Saint Peter to Stephen VI (891). Until recent years its authorship was assigned to Anastasius, the librarian, who lived in the 9th century.

Duchesne and Mommsen both agree that the collection as we have it is a second edition and that it is an expansion of certain primitive catalogues of the Popes, some of which date as far back as the 2d century.

In the opinion of Duchesne, the biographies of the Popes from the 6th to the 9th centuries were written by contemporaries. The 'Book of Popes' has been edited in the 17th century by Fabrotti (Paris 1647), by Bianchini (Rome 1718), by Muratori and by Migne in the 19th. The text may now be said to be fixed by the edition of the Abbé L. Duchesne (Paris 1886–92).

Of great importance in determining the topography of the Catacombs and the churches and shrines of the early Church are the guidebooks written by the pilgrims of the Middle Ages. The earliest of these is the 'Itinerarium' of John the Priest, which belongs to the end of the 6th century. John was sent by Theodelinda, queen of the Lombards, to Gregory the Great to obtain relics of the martyrs. These he did not obtain, but he brought back with him oil from the lamps that burned before their tombs. On each phial he inscribed the name of the martyr and the place of his burial. The original catalogue written by John is still preserved in the treasury in Monza.

The best known guidebook is that of William of Malmesbury, compiled in the 12th century, perhaps for the use of the Crusaders. Other guidebooks are those preserved in the monasteries at Einsiedeln and Salzburg. They throw much light on the topography of the Catacombs. To these same pilgrims and to the monks of the 8th century we owe many collections of inscriptions, that have since perished. The 'Codex Palatinus' of Heidelberg contains more than a hundred, some of them in metre, taken from the papal tombs of the 4th, 5th and 6th centuries. Other collections of inscriptions from Rome, Ravenna, Milan, France and Switzerland are preserved in Saint Gall, in Switzerland, in Verdun and Würzburg.

During the Middle Ages the study of ancient Christian monuments was neglected, the Catacombs were well nigh forgotten, but interest in them was revived at the time of the Renaissance and rediscoveries in the 16th century made possible scientific examination. Anthony Bosio, chargé d'affaires of the Order of Malta, spent 30 years in the Roman Catacombs, reproducing mural paintings, deciphering and copying inscriptions. He has been called the "Founder of Christian Archæology," but this title belongs by better right to John Baptist de Rossi, who by his explorations and writings has given to the study the character of an exact science. He was a Roman, who, at the age of 24, began the study in 1842 under the direction of Padre Marchi, and his 50 years' labor accomplished much in reconstructing the artistic, doctrinal and family life of the Christian community of early Rome. He died in 1899, leaving his work to be carried on by Armellini, Marucchi, Wilpert and Stevenson. His classic 'Roma Sotterranea' has been translated in part into English by Northcote and Brownlow.

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WILLIAM J. WHITE, D.D.

CHRISTIAN ARCHITECTURE, that of the schools which have grown up among the peoples generally Christian in belief; but more especially the architecture of churches and their dependencies. The term is used commonly in both senses. Thus, at the time of the Gothic revival in England (most active between 1850 and 1870) the term "Christian architecture" was used especially to denote Gothic art and Gothic and Romanesque art taken together; and this because it was assumed that those styles were peculiarly the creation of the Christian organization, as distinguished from the neo-classical styles of the Renaissance and later epochs, which had obviously been developed from the study of ancient Greco-Roman architecture.

Styles which are in a strict sense Christian are (1) the Latin style, identified with the basilicas of the Western Church built from the 4th to the 9th century, and most numerous in Italy, especially in Rome and Ravenna. The Christian basilicas are extremely simple in structure and design. The entrance is generally from a square peristyle, like a cloister; though the narthex or vestibule often replaces it. A nave from 30 to 50 feet wide is divided from two aisles by rows of columns often taken from

classical buildings. These columns carry the clerestory wall which rises above the aisle roofs and between the windows of the clerestory, and above and below the windows there are large flat surfaces commonly filled with pictures and decorative scroll-work in mosaic. There are sometimes two additional aisles. The aisles and the nave all stop against the transept, which is often higher and generally wider than the nave and is the most striking part of the buildings, but in many of the smaller basilicas no transept exists. Beyond the transept, that is, farther from the entrance doors, an apse projects, and this originally contained the seats of the bishop and his clergy. The high altar had different places at different periods, but the middle of the transept, on the axis of the great nave, was the more usual place and a baldacchino or permanent canopy was built over it—a feature which was preserved in later Italian churches; (2) the Byzantine style, finding its great central monument in the church of Saint Sophia, Constantinople, and spread over the Balkan Peninsula, parts of Asia Minor and Syria, with offshoots in Egypt and Persia, and with more recent developments among the churches of Russia; (3) the Romanesque style of western Europe, developed from the attempt of the church builders to roof their naves and aisles, choirs and apses, with vaulting, copied at first from the Imperial Roman examples, which were numerous throughout western Europe, but always with inferior materials and skill; then developing into a more florid style, taking different characteristic forms according as it was influenced more or less by Eastern intercourse, and spreading over Europe from Hungary to Scotland and Spain; (4) the Gothic style, which is the Romanesque style carried to its legitimate sequence in the way of vaulting, but greatly changed by the very perfection of that constructive process, the buildings growing larger and lighter, more open and with a constant tendency of the walls to disappear until the building becomes a stone roof supported on light uprights, with no wall surface except under the great windows; the windows themselves very rich in colored glass and filling large parts of the upright screen or enclosure of the buildings. These are the four great divisions of Christian architecture in the strictest sense; all these styles are treated in the general article ARCHITECTURE.

There are exceptional forms, less important but very interesting, hardly to be classified under the above general divisions. Thus, there exists in Syria a style of building which was entirely unknown until the explorations of the Comte de Vogüé (about 1860–65) and which has been studied since by an American expedition. This is a Romanesque of singular simplicity and consistency of design, the buildings being entirely of stone, roofed and fitted in every part with solid stone, and the whole style growing out of Imperial Roman construction as adapted to a country where stone was the material most easily procured. The resulting style was, however, generally unrestrained by Greco-Roman traditions. The general design and the sculptured detail alike were singularly free, original, logical, inevitable, in their conception. It has been pointed out by French critics that the quality of clearness and original thought in design is present in all the earlier and finer buildings. The Christian symbolism, which, in its more elaborate forms, is shown most perfectly in the mosaics of central Italy (see the Latin style above), is seen in its simplest form carved on the lintels and wall-panels of these churches. The cross in its many forms, the sacred monograms and ciphers, the vine and other plants identified with the Christian teaching of the East, are used with marked success in these carvings both as symbolism and as decoration. The churches of Syria are of singular simplicity and charm. Again, although the Gothic architecture of Europe reached its culmination at the close of the 13th century, and was less energetic, less fruitful of new thought during the 14th century, this was followed by an independent and most attractive style in the 15th century, which on the Continent we call generally the Florid Gothic or Flamboyant style, whereas in England it took the shape of the formal and rigid Perpendicular and passed into the Tudor style with its far vaulting. (See VAULT). Yet again, as the Italians never understood Gothic architecture nor sympathized with it, there are only a few monuments which are strictly Gothic, but the great cathedrals of Orvieto, Siena and Florence and churches throughout the peninsula and in Sicily, are Gothic in detail, and are adorned by a magnificent system of sculptured and colored decoration. It is to be noted that from the beginning of the 15th century onward the artistic design is less and less dependent on church buildings; the important dwellings of the nobles in the country, and of citizens in the towns, modifying greatly the style of the day and sometimes taking the lead away from ecclesiastical structures. It is entirely a matter of private judgment how far this change tends to remove those later styles from the field of Christian architecture.

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CHRISTIAN BROTHERS. See BRETHREN OF THE CHRISTIAN SCHOOLS.

CHRISTIAN BROTHERS COLLEGE, Roman Catholic institution situated in Saint Louis, Mo., conducted by the Brothers of the Christian Schools. In 1855 it was established and incorporated with power to confer degrees. The modern language department is given special attention, the pupils being required to converse and write in French, German and Spanish. Practical engineering, mechanical and scientific draughting and designing are emphasized in the scientific department. There are also com-

mercial and preparatory departments. Literary and musical courses are aided by the various organizations which contribute to the development of good taste. The graduates of this college are among the distinguished men of the country. The value of the college buildings and grounds is about $650,000, and the total annual income $40,000. The library contains about 22,400 volumes. The student enrolment in all departments in 1916 was 340, and there were 40 instructors.

CHRISTIAN CHURCH, The, a body of believers who adopt this simple Biblical name and accept the Bible as their rule of faith and practice, in devotion to the principle of unity and as a testimony against sectarianism. Another body, commonly known as the Disciples of Christ, are also called Christians in some sections, and in consequence the two denominations, which are in no way ecclesiastically connected, are confused in the popular mind, and one is taken for the other. The Christians, for the sake of distinction, have been called the Christian Connection, but the denomination itself objects to it. In rejecting sectarian names it does not arrogate to itself the idea of exclusive right to the use of the name, nor deny that those using distinctive denominational titles are Christian. They recognize all believers in Christ as God's children, and as such welcome them to their fellowship, holding, however, that those who assume the name Christian, a family name, should also welcome all followers of Christ into their fellowship. They believe that other names are divisive, but that this name is unifying.

The Christian Church dates back in its earliest beginning to 1794. Three separate divisions united to constitute it. One of these arose in Virginia, led by Rev. James O'Kelly, who left the Methodist Church, with a number of followers, on account of dissatisfaction with the discipline and methods of that Church. They chose for the new organization, formed in 1794, the name Christian. The second branch was formed in Vermont in 1801 by Elias Smith and Abner Jones, Baptists who dissented from the Calvinistic doctrines and the polity of the Baptist churches. Other Baptists came to their standard, which affirmed the Bible as their creed and the name Christian as their sufficient designation. Many churches were organized in connection with this movement. The third strand was Presbyterian in origin. In Kentucky differences arose in 1800–01, among Presbyterians in the Crane Ridge revival, and Barton W. Stone led those who withdrew and formed a new organization with the same name and similar principles as the Virginia and Vermont bodies. Each of these movements was unknown to the others until later on when they came together, agreed to principles and polity and united in the organization known as the Christian Church. In 1832 a joint meeting between Barton W. Stone, representing, with others, the Christians, and Messrs. Smith and Johnson, the Disciples of Christ, took place, the outcome of which was an agreement to unite under the name Christian. The agreement was not fully carried out, but many Christians followed Stone in uniting with the Disciples of Christ, whose name in that section was afterward Christian. The Christian Church holds to the following principles:

1. The Lord Jesus Christ is the only head of the Church.
2. The name Christian is the only appellation needed by the Church.
3. The Holy Bible, or the Scriptures of the Old and New Testaments, are a sufficient, and should be the only, rule of faith and practice.
4. Christian character, or vital piety, is a just, and should be the only, test of membership, or fellowship in the Church of Christ.
5. The right of private judgment and the liberty of conscience are a right and a privilege that should be accorded to and exercised by all.

Under these principles the Christian Church contends for the oneness of the people of God and the blessings of truth in a wholesome evangelical toleration, in all matters which rest for solution on mere human opinions. Thus "the Presbyterians went into the water without becoming Baptists; the Baptists continued baptism without exclusiveness, and the Methodists fellowshipped both without becoming Calvinists," conflicting elements were harmonized in the spirit of brotherly love, the body was one in Christ and each one held to the truth as he saw it.

Deprecating the divisive character and the evils of human creeds and party shibboleths, they determined to take the Bible as their only confession of faith, with Christian character under the new birth (John iii, 1–7) as the only test of church membership and Christian fellowship, leaving each individual in full possession of the right of individual interpretation in all matters of opinon on theological questions.

In the United States and Canada the Christian Church now has 71 annual conferences, with 1,500 ministers and 113,000 members. They work under a congregational form of government. Their national body is The American Christian Convention, with headquarters at Dayton, Ohio, Rev. J. F. Burnett, D.D., secretary. To this people belong the distinction of having published the first religious newspaper ever published in the world—*The Herald of Gospel Liberty,* now published at Dayton, Ohio. The Christian Church also publishes *The Christian Sun,* Elon College, N. C., *The Christian Vanguard,* Toronto, Canada, *The Christian Missionary,* Dayton, Ohio, *The Messenger,* Sendai, Japan, besides a number of smaller periodicals and many books of permanent value. To this body also belongs the honor of having first opened the college to both sexes with equal privileges establishing the practice of coeducation. They now own colleges in Indiana, Ohio, North Carolina, New York, Missouri and Wyoming. Their theological seminary is The Christian Divinity School, a department of Defiance College, Defiance, Ohio.

The Christian Church was among the first denominations to split over the issues of the Civil War, the separation taking place in the National Convention held at Cincinnati, Ohio, in October 1854. Some years after the issues of the Civil War had been settled, there was a reunion at a National Convention at Marion, Ind., in October 1890. After 36 years of separation they came together without a jar, under the motto: "In essentials, unity; in non-essentials, liberty; in all things, charity." The general trend of the Christian Church in the fundamental doctrines of Christianity is Ar-

minian. They hold to the divinity of Christ, to the vicarious atonement, to the lost condition of the unregenerate, to salvation through Christ. They use either mode of baptism common in evangelical churches and practise open communion at the Lord's table. As is common in all denominations to-day, there are a few among them who do not adhere to some of these teachings.

As a whole the Christian Church stands for an evangelical Christianity, for the divine inspiration of the Scriptures, recognizing their authority as final in all matters of faith, practice, and doctrine. They steadfastly maintain, not that they have no creed, as some ignorantly or wilfully affirm, but that they have no creed but the Bible, allowing nothing in the way of any human expression of doctrine to displace them in this position. Consult Burnett's 'Origin and Principles of the Christians' (Dayton, Ohio, 1903).

J. PRESSLEY BARRETT,
Editor of 'The Herald of Gospel Liberty.'

CHRISTIAN CHURCH, Divisions and Statistics of the. The term Christian Church is here used in a comprehensive sense. Some religious bodies adopt it as a denominational title; a few claim the exclusive right each to be considered as the one and only Christian Church. The broad use of the name here includes all religious bodies which worship Christ as divine, or revere Him as a great religious teacher and example, and wish to be called by His name.

Divisions of the Christian Church.—There are three main divisions of the Christian Church: (I) The Roman Catholic; (II) the Eastern Orthodox; (III) the Protestant. A separation took place between the Eastern and Western sections of the Christian Church in the 11th century, the Western section adhering to the primacy of the bishop of Rome, the Eastern section adhering to the primacy of the patriarch of Constantinople. Thus was created the first and second divisions; the third division, the Protestant, arose from a schism in the Western section, begun in 1517 by Martin Luther, in what is known as the Reformation and resulting in a division of the Church in the West into the two great bodies of Catholics and Protestants.

I. Western Division — The Roman Catholic Church.— The "Holy Catholic Apostolic Roman Church" claims to be the oldest, the original, Christian Church, tracing its beginning to the appointment of the disciple Peter by Christ himself as the chief Apostle, and delivery to him of the "keys." Peter resided at Antioch and then at Rome, according to tradition, where he was martyred in A.D. 67. He heads the list of bishops of Rome, in which office he has had 259 successors. While two other bodies claim an origin quite as early and equally apostolic (see ARMENIAN and SYRIAN ORTHODOX), the Church which had its capital at Rome from the beginning was the chief, if not the only, Christian Church in primitive times, including the Eastern capital at Constantinople. The first great separation in the Christian Church occurred in the 11th century, over the *filioque* controversy and other differences, the Church at Rome adhering to the doctrine that the Holy Ghost proceeds from the Father and the Son, and the Church at Constantinople maintaining the view that He proceeds from the Father alone. The Roman Church, including western and southern Europe and Africa, excepting Egypt, recognized the primacy of the bishop of Rome, whose other ecclesiastical titles, as now stated, are, "Vicar of Jesus Christ, Supreme Pontiff of the Universal Church, Patriarch of the West, Primate of Italy, Archbishop and Metropolitan of the Roman Province, and Sovereign of the Temporal Dominions of the Holy Roman Church." Connected with the Roman Catholic Church are bodies in Europe, Asia and America, called Uniates, who represent secessions from the Eastern Churches, at various times. The great body of the Church uses the Latin ritual, which obtained from the beginning, but the Uniates, in consideration of acknowledging allegiance to the Pope and accepting the dogmas and sacraments of the Roman Church, are allowed to use their own rites, which are chiefly in the Greek, the Armenian, the Syrian and the Coptic, and certain other privileges to which they had been accustomed. The Roman Catholic Church is world-wide in its territorial range, having churches and members in all continents, countries and populations.

2. To the Western division also belong small bodies which are not in communion with the Roman Catholic Church, having separated from it chiefly because they reject papal claims and dominion. Among these dissidents are the Old Catholics of Germany, Austria, Switzerland and other countries of Europe, including the Jansenists of Holland; also the Polish National Church of the United States and the American Old Catholic Church, no one of which has obtained a large following.

II. Eastern Division — Eastern Orthodox Churches, specifically called the "Holy Orthodox Catholic Apostolic Eastern Church." This division includes properly the Hellenic, Russian, Syrian, Rumanian, Serbian and other Orthodox Churches, which, though independent of one another, are in general agreement in matters of doctrine, worship and practice, accepting the seven ecumenical creeds (those adopted before the division of the 11th century), and having rituals of the same general type, though differing in language.

1. *The Greek Orthodox Church.*— In the separation between the Western and Eastern sections of the Christian Church, Constantinople, which had been the eastern capital of the Roman Empire, became the capital city of the Eastern Church. Constantine the Great had issued an edict of toleration for Christianity in the 4th century, and a patriarch had been at the head of the Church in the East long before the separation. The patriarch of Constantinople is still at the head of the Greek Christians of Turkey.

2. *The Hellenic Orthodox Church* is the national church of Greece. It is independent of the Greek Church of Turkey, and is governed by a synod of bishops.

3. *The Orthodox Church of Russia,* embracing the empire, was for some time under the control of the patriarch at Constantinople, but became independent in the process of time and had its own patriarch until the patriarchate was abolished by Peter the Great, to be restored in 1917 after the dethronement of the Tsar.

Archbishop Tikhon, of Moscow, is the new patriarch.

4. *The Serbian Orthodox Church* embraces Serbia, with a patriarch resident at Belgrade.

5. *The Orthodox Church of Austria-Hungary* consists of Serbs, Rumanians and Ruthenians resident in the empire, under distinct heads.

6. *The Orthodox Church of Montenegro* is under the rule of bishops.

7. *The Orthodox Church of Bulgaria,* embracing Bulgaria and Macedonia, is under the care of an exarch.

8. *The Syrian Orthodox Church* is composed of Syrians by birth and descent who speak only the Arabic language, and has two patriarchates, one at Antioch and the other at Jerusalem. There are several thousand of these Christians in America, where they are under the care of the Russian Orthodox Church.

9. *The Orthodox Church of Rumania* is under the supervision of the metropolitan of Bucharest.

10. There are still in existence the ancient patriarchates of Alexandria and Mount Sinai, with a reduced number of sees and followers; also the Orthodox Church of Cyprus.

11. *The Armenian Church.*—Although not in the Orthodox Eastern Communion it is an ancient Church of the East, which traces its origin through shadowy tradition to the Apostles Bartholomew and Thaddeus, and claims a vigorous renewal and organization under Gregory the Illuminator in Armenia, before the close of the 3d century, resulting in the acceptance of Christianity by the king, making Armenia the first Christian country. The patriarch, or catholicos, has his seat at the foot of Mount Ararat in Transcaucasia. Persecutions have widely scattered the Armenians, a considerable number of whom are in America.

12. There are a number of Churches, the Coptic or Jacobite Church of Egypt and Syria, the Church of Abyssinia, the Nestorians and Chaldeans, which are not orthodox; but for want of a more suitable classification they are included with the Eastern Churches, together with numerous dissenting sects in Russia, the Raskolniks, or schismatics; also similar bodies in other countries where the Eastern Orthodox Church is found in strength.

III. Protestant Division.—This division embraces practically all the Christian bodies not included in the first two divisions, and they are great in number and in diversity of belief, government and practice. The multiplicity of small bodies with their differences manifests the diversity of Protestantism; on the other hand, the fact that the overwhelming mass of Protestants are found in the great evangelical communions, like the Anglican, the Baptist, the Lutheran, the Methodist, the Presbyterian and the Reformed, manifests the orthodox unity of Protestantism.

Protestantism historically began with the Reformation of Luther; but there were reformers before Luther, and divergences from Roman Catholic belief and discipline before his day, as witness Peter Waldo, of the 12th century, and John Huss, burned at the stake as a heretic in 1416, and the Waldenses (q.v.) and the Bohemian Brethren (q.v.). Out of the Reformation led by Luther in Germany, beginning in 1517, and by Zwingli, Knox and others in other countries, have grown through the mutations of the centuries and by division and subdivision the ecclesiastical organizations known collectively as Protestantism (q.v.).

1. *Evangelical Lutherans.*—The direct outcome of the Reformation, this communion, called "Lutherans" by Catholic contestants, a name opposed by Luther as "sectarian," embraces in its numerous branches most of the countries of the world. These bodies are practically one in belief, holding either to the Augsburg Confession or to the Book of Concord, or to both; but using the episcopal form of government in Scandinavia and other parts of Europe and the congregational or presbyterial systems in the United States and elsewhere. In Germany, (a) United Evangelical State Church is reckoned as about seven-eighths Lutheran and one-eighth Reformed; (b) Old Lutherans and other Lutheran organizations which are without state connection; (c) Evangelical Lutheran Church of Sweden; (d) of Norway; (e) of Denmark and Iceland; (f) in Russia, including Poland and Finland; (g) in Hungary; (h) in Holland; (i) in Switzerland; (j) in France; (k) in the British Isles; (l) also in various other European countries; (m) also in Asia, Africa and South America; in the United States; (n) General Synod; (o) General Council; (p) United Synod South; (q) Synodical Conference; (r) Norwegian Church; (s) Synod of Ohio; (t) Synod of Iowa; (u) eight other smaller bodies. Other bodies of Lutheran origin are (v) German Evangelical Protestant Church and (w) German Evangelical Synod, both of which were originally from the Evangelical State Church of Germany. Also, Swedish Evangelical bodies, outcome of the Waldenstromian movement in Sweden; (x) Swedish Evangelical Mission Covenant, and (y) Swedish Evangelical Free Mission.

2. *Reformed and Presbyterian Churches.*—In Continental Europe, the Reformation proceeded along two distinct lines, the Lutheran and the Reformed, the latter being more emphatically Augustinian, or Calvinistic, in doctrine. Led by Zwingli, Calvin and others, it also differed from the Lutheran in its views of the eucharist. Churches were organized as follows: Reformed Church in (a) Germany; (b) in Switzerland; (c) in Austria; (d) in Hungary; (e) in Bohemia; (f) in Holland; (g) in France. In Prussia and other German states the Reformed and Lutheran Churches were united in 1817 in the Evangelical State Church. Holland continues to be a stronghold of the Reformed Church, whence it was early planted in the East Indies, Africa and America. (h) Reformed Church in America and (i) Christian Reformed Church came here from Holland; (j) Reformed Church in the United States and (k) Hungarian Reformed Church came from Germany and Hungary respectively. (l) Waldensian Church of Italy, antedating all the Reformed Churches, properly belongs to this group, or to the Presbyterian. The Presbyterian Churches proceeded from the Reformation in the British Isles, led by Hamilton, Wishart and Knox, and established in 1560. In doctrine and polity the Presbyterian Churches are in general harmony with the Reformed Churches of the Continent. Existing bodies of the Presbyterian name, omitting small organizations, are: In Scotland, (a) Church

of Scotland; (b) United Free Church; (c) Free Church; (d) Reformed Presbyterian Church; (e) United Original Secession Church; in England and Wales, (f) Presbyterian Church of England; (g) Calvinistic Methodist Church of Wales; in Ireland, (h) Presbyterian Church of Ireland; (i) Reformed Presbyterian Church; (j) Secession Church; in the British Colonies, (k) Presbyterian Church in South Africa; (l) Presbyterian Churches in Australasia; (m) Presbyterian Church in Canada; in the United States; (n) Presbyterian Church, Northern; (o) Cumberland Presbyterian Church; (p) United Presbyterian Church; (q) Reformed Presbyterian Church, Synod; (r) Reformed Presbyterian Church, General Synod; (s) Associate Reformed Synod of the South; (t) Welsh Calvinistic Methodist Church. Other small bodies in the United States and elsewhere are omitted. The Reformed and Presbyterian Churches of the world are united in an "Alliance of the Reformed Churches throughout the World holding the Presbyterian System."

3. *The Church of England* and its branches in various parts of the world constitute the Anglican Communion. The Church of England definitely ceased to be a part of the Roman Church in the reign of King Henry VIII, about a century after Luther's break with that body. Christianity was carried to the ancient Britons from the adjacent continental countries, as is supposed, and it is claimed that the Church of England, which holds that it has unbroken apostolic succession for its prelates and clergy, was always a national Church, and was not continuously subject to the see of Rome. The branches are (a) Church of England; (b) Church of Ireland; (c) Episcopal Church of Scotland; (d) Protestant Episcopal Church in the United States; (e) Church of England in Canada; (f) in the West Indies; (g) in India and Ceylon; (h) Holy Catholic Church in Japan (missionary); (i) Holy Catholic Church in China (missionary); (j) Church of England in Africa; (k) in Australia and Tasmania; (l) in New Zealand and Melanesia. There are independent sees in Newfoundland, South America, Asia, Africa and other countries, which hold relations direct with the archbishop of Canterbury, the primate of England. The various branches meet in Conference at Lambeth at long intervals. (m) The Reformed Episcopal Church of the United States, Canada and England historically belongs to the Anglican group, though it is not in union with it.

4. *The Baptist Churches.*—These date back through the Anabaptists to within a few years of the time of Luther. Anabaptist churches, which refused to recognize infant baptism as valid, were formed in Switzerland as early as 1523, and sprang up later in Holland, Germany, England, whence the modern type came to the United States. Baptist churches use almost without exception the congregational or independent form of government, and hold to the principle of baptism of believers only by immersion. They are divided by national boundaries, and in the United States by differences in doctrine, practice, etc. The chief bodies are in the United States and England: (a) Baptist Union of England and Wales (omitting some small bodies); (b) Baptist churches in Scotland; (c) in Ireland; in the United States, where the great majority of Baptists are found—(d) Northern Baptist Convention; (e) Southern Baptist Convention; (f) National Baptist Convention (two colored bodies claiming the same name); (g) Primitive Baptists, very conservative; (h) Freewill Baptists; (i) 10 smaller bodies; (j) Baptist churches of Canada; (k) Baptist churches of Australia. Considerable numbers of Baptists are found in Germany, Russia, Sweden and other European countries, and in the mission fields of Asia, Africa and South America. Similar in doctrine and practice are the (l) German Baptist Brethren, or Dunkards (four bodies); and the Churches of God (Winebrenner).

5. *Congregationalists.*—The first churches of this order—full autonomy or independence of the local church—were formed in England in the last quarter of the 16th century, one of which emigrated to Holland and thence to the United States in 1620. (a) Congregational Union of England and Wales; (b) Congregational Union of Scotland; (c) Congregational Union of Ireland; (d) Congregational Conference of the United States; (e) Congregational Churches of Canada; (f) in Africa; (g) in Australasia; (h) in Holland; (i) in Germany, Sweden and other parts of Europe; also in mission fields of Turkey, India, China and Japan.

6. *Friends* or *Quakers* (George Fox, Drayton, England, founder), date from the middle of the 17th century. They regard the sacraments as spiritual, and do not observe them by outward rites, and they are non-resistant. Persecution drove English Friends to the United States, Canada and elsewhere. In England, (a) Yearly Meeting of Friends; in the United States, (b) General Conference of Friends, Orthodox; (c) Society of Friends, "Hicksite"; (d) Society of Friends, "Wilburite"; (e) Society of Friends, Primitive.

7. *Mennonites.*—A group of 12 or more small bodies in the United States and Canada, and other bodies in Europe, who regard Menno Simon, a Waldensian preacher of the 16th century, as their founder. They came to the United States from Germany, Holland, Switzerland, Russia, in our colonial days. They reject infant baptism, baptize generally by pouring and hold to the principle of non-resistance.

8. *Moravians.*—A body rising out of the Huss movement in Bohemia and Moravia, whose official name is Unitas Fratrum. Their headquarters are at Herrnhut, Germany, there being three branches, (a) German, (b) British, (c) American. They hold close relations with the Union of Bohemians and Moravians, which has a small representation in the United States.

9. *Methodist Churches.*—Originating in 1739 in England, through the preaching of John and Charles Wesley, George Whitefield and other clergymen of the Church of England, carried to the United States in 1760–66 by immigrants and spread over the world, Methodism embraces: in the British Isles, (a) the Wesleyan Methodist Church; (b) the Primitive Methodist Church; (c) the Wesleyan Reform Union; (d) the United Methodist Church; (e) the Independent Methodist Churches; in the United States; (f) Methodist Episcopal Church; (g) Methodist Episcopal Church, South; (h) Methodist Protestant Church; (i) African Methodist Episcopal Church; (j) African Methodist Episcopal Zion Church; (k) Colored Methodist Episcopal Church; (l) Free Methodist Church; (m)

American Wesleyan Methodist Church; (n) Primitive Methodist Church; (o) five other small bodies; (p) Methodist Church of Canada; (q) Australian Methodist Church; (r) New Zealand Methodist Church; (s) Methodist Church of Japan. The latter is the product of missions of three Methodist bodies; there are also large numbers of members in the mission fields of Asia, Africa, Europe, South America and elsewhere. Four other bodies in the United States of kindred belief and practice, which have been represented in the Ecumenical Methodist Conference, decennial, are (t) Evangelical Association; (u) United Evangelical Church; (v) United Brethren in Christ; (w) United Brethren in Christ (Old Constitution).

10. *Disciples of Christ.*— A considerable body in the United States and other countries, with non-sectarian name and principles, with which may be classified the Christians, an organization of similar purposes and principles. Neither has any creed but the Bible. The former are often called by the name of the latter. Both originated in the early part of the 19th century. Another small body known as the Christian Union may be included in this group.

11. *Unitarians.*—A liberal body, in the United States, England and Hungary, who do not accept the doctrines of the Trinity or the divinity of Christ. They arose in the United States early in the 18th century, and in Hungary about a century earlier.

12. *Universalist Church.*— This body arose in the United States at the close of the 18th century. It holds to the final salvation of all persons.

13. *New Jerusalem Churches.*— Two small bodies descended from the movement begun by Emanuel Swedenborg, in England, near the close of the 18th century.

14. *Adventists.*— A group of half a dozen bodies of premillennialists, baptizing by immersion, and congregational in polity, arising in 1840–50, the chief of which are, (a) Advent Christians and (b) Seventh Day Adventists. The latter is represented in most of the countries of the world.

15. *Plymouth Brethren.*— A group of four or more bodies, calling themselves simply Brethren. They hold premillennial views, have unpaid, unordained preachers and baptize generally by immersion. Found in England, Canada, the United States and other countries.

16. *Church of Jesus Christ of Latter-Day Saints,* commonly called Mormons, from the Book of Mormon which they accept as inspired revelation. There are two bodies, (a) the Utah branch, which taught polygamy as a divine revelation, and practised it, but promised to discontinue it when Utah was admitted as a State. It is a large body and has missionaries and followers in many countries besides the United States. The (b) Reorganized branch protests against polygamy.

17. *Salvation Army,* an organization of workers, with a mission to those not reached by the churches. It originated in England in 1876, and is found in many parts of the world.

18. *Church of Christ, Scientist,* founded by Mrs. Mary Baker Eddy, in the last quarter of the 19th century, on the doctrine that spirit is immortal and dominant, and that through it evil and disease are to be overcome. It has churches, or temples, in other countries besides the United States.

19. There are many other small bodies of Christians in the United States and the rest of the world, which cannot be classified.

IV. Statistics of the Christian Church.— Three things must be said as to the world statistics of the Christian Church: First, it is impossible to array them in detail by countries, for the reason that some of the large communions, to say nothing of many small bodies, do not present the necessary data; for example, the Church of England makes no returns, even for England and Wales, either of communicants or church population. Second, though most of the Churches of the United States and a number in other countries make official reports of communicants, and a number in other countries give official reports of population, and decennial censuses give more or less accurate returns of communicants or population, estimates, more or less uncertain and vague, have to be used for the rest of the world. Third, some of the returns, or estimates, are not even recent, but 10 years or more old and some nearly twice that. It should be understood that the totals, except for the various communions, are to be taken as approximate, not as exact.

Of the population of the world, estimated at 1,691,751,000 by the National Geographic Society, of Washington, D. C., 609,414,000 is Christian. This number includes members, or communicants, and adherents, making together what is called "church population." Distributed among the three great divisions of Christianity — Roman Catholic, including Uniates, i.e., those of the Eastern Orthodox division who have acknowledged the supremacy of the Pope, Old Catholics, etc.; Eastern Orthodox, including Armenians, Jacobites, Copts, Abyssinians and Russian Schismatics; Protestants, including evangelical and non-evangelical, orthodox and heretical, bodies — we have these results: Roman Catholic, 294,583,000; Eastern Orthodox, 120,729,000; Protestant, 194,102,000. These figures show an increase over these heretofore given by 'Whitaker's Almanac,' London, and other authorities, of 21,723,000 in the Roman Catholic division, of 729,000 in the Eastern Orthodox, and of 22,452,000 in the Protestant. Later and more accurate statistics, from many of the countries of Europe especially, would probably make important changes in these totals. The following table gives a distribution of the three divisions by continents:

CHRISTIAN POPULATION BY CONTINENTS

	Roman Catholic	Eastern Orthodox	Protestant	Total
Europe...	183,760,000	112,281,000	100,000,000	396,841,000
Asia.....	5,500,000	3,800,000	6,500,000	15,800,000
Africa....	2,500,000	3,648,000	2,750,000	8,898,000
North America.	50,000,000	1,000,000	79,352,000	130,352,000
South America.	44,623,000	.....	1,000,000	45,623,000
Oceania...	8,200,000	.....	4,500,000	12,700,000
Grand totals...	294,583,000	120,729,000	194,102,000	609,414,000

The Christian faith greatly outnumbers any of the other faiths of the world and is the most aggressive, active and prosperous. If Confucianism be regarded as a religion, and the disciples of the ancient sage be classified with Taoists, as is commonly done, this ethical cult

stands second, with 300,830,000, according to accepted estimates, Islam coming third, with about 222,000,000, and Hinduism fourth with 210,000,000. The combined strength of Confucianism and Moslemism falls more than 86,000,000 short of the total of Christians.

The Christian following in the world, though unquestionably gaining on the total population, has not yet reached the half-way mark, which is 845,875,000. It has passed the one-third stage, having over 36 per cent.. It is not possible to say with much certainty what the gain of the Christian Church has been in the last quarter of a century, but it is probably from 50,000,000 to 60,000,000. The Eastern Orthodox Churches are gaining little, if any, outside of Russia; but the Roman Catholic Church and the Protestant bodies are making advances, both divisions being active and successful in missionary work in all parts of the globe.

As Christianity is a development of Judaism, the Jewish Bible being also the Christian Bible, with the Christian Gospels and Epistles added, the two faiths may be classified together for comparison with the other faiths of the world, the two having more in common, despite some radical differences, than either has with any other religion. Adding to the Christian population of the world 609,414,000, the Jewish 13,980,715, we have a grand total of 623,394,715. Of the Jews, 9,986,447 are in Europe, and the next largest number, 2,144,061, in North America.

Of the three divisions of the Christian Church, the Roman Catholic has a little more than 48 per cent of the entire Christian population of the world; the Protestant a little less than 32 per cent, and the Eastern Orthodox the remaining 20 per cent.

The Roman Catholic division is first in Europe, in South America and in Oceania.

The Eastern Orthodox division is first in Africa.

The Protestant division is first in North America and in Asia.

In Europe the Roman Catholic Church predominates in numbers in the countries of Austria-Hungary, Belgium, France, Spain, Portugal and Italy; the Protestant churches are first in Great Britain, Germany, Scandinavia, Holland and Switzerland. The Eastern Orthodox Churches are first in Russia, the Balkan States, Greece and Turkey.

The Christians embrace nearly six-sevenths of the population of Europe, thirteen-fourteenths of that of North America and four-fifths of that of South America. It is a minority faith in Asia and Africa, having about one-sixteenth of the population of the latter and one fifty-sixth of the population of the former. Putting it in another way, of every 100 inhabitants of the world, 36 are Christians; of Europe, 85; of North America, 93; of South America, 82; of Asia, 2, and of Africa, 6.

Protestant communions and bodies, as described under the head of "Divisions":

ANGLICAN COMMUNION

	Communicants	Population
Great Britain and Ireland	.....	17,500,000
British Colonies, Canada, Australia, etc.	.....	6,000,000
United States and missions including Reformed Episcopal	1,102,020	3,306,060
Total	.....	26,806,060

BAPTIST COMMUNION

	Communicants	Population
United States, Canada, South America, West Indies	7,020,525	21,061,575
Europe	617,607	1,852,821
Asia	213,647	640,941
Africa	18,924	56,772
Australasia	30,168	90,504
Dunkards, Church of God in United States	156,938	470,814
Total	8,057,809	24,173,427

CONGREGATIONAL COMMUNION

	Communicants	Population
United States, Canada and missions	905,290	2,715,870
Great Britain, Ireland and missions	541,251	1,623,753
Australasia	21,760	65,280
Total	1,468,301	4,404,903

DISCIPLES OF CHRIST

	Communicants	Population
United States and missions	1,469,345	4,408,035
Christians, Christian Union, United States, missions	122,984	368,952
Total	1,592,329	4,776,987

EVANGELICAL LUTHERAN

	Communicants	Population
United States	2,460,937	7,382,811
Germany	.....	32,546,852
Scandinavia	.....	10,463,000
Russia, including Poland and Finland	.....	6,115,242
Hungary	.....	1,310,000
Austria, Holland, France, British Isles	.....	1,042,000
Asia	.....	412,000
Africa	.....	431,000
Oceania	.....	244,000
South America	.....	770,000
British America	.....	424,396
Scandinavian bodies in United States	.....	188,700
German Evangelical Protestant in United States	.....	104,112
German Evangelical Synod in United States	.....	845,973
Total	.....	62,280,086

METHODIST COMMUNION

	Communicants	Population
United States, Canada and missions	8,607,631	25,822,893
Great Britain, Ireland and missions	1,259,307	6,296,525
Australasia	174,608	873,040
United Brethren in Christ (two bodies)	370,839	1,112,487
Evangelical Association (two bodies)	220,900	662,700
Total	10,633,285	34,767,645

PRESBYTERIAN AND REFORMED COMMUNION

	Communicants	Population
United States	2,778,624	8,335,872
Canada	346,822	1,117,200
England and Wales	293,166	893,166
Scotland and Ireland	1,366,972	4,066,972
Germany	.....	5,000,000
Holland	.....	2,500,000
Hungary	.....	3,000,000
Switzerland	.....	1,700,000
France and other countries of Europe	.....	1,750,000
Africa	.....	1,000,000
Asia	.....	600,000
Australasia	.....	900,000
South America	.....	100,000
Total	.....	30,963,210

OTHER BODIES

	Communicants	Population
Mennonites, United States, Canada, Europe	.....	250,000
Moravians, American, British, German branches	.....	221,601
Friends, United States, Great Britain, missions	.....	146,000
Adventists, United States, other countries	.....	773,671
Unitarians, United States, England, Hungary, etc	.....	200,000
Latter-Day Saints (Mormons, two bodies), United States, Europe	.....	500,000
Church of Christ Scientist, United States, England, etc	.....	150,000
Unclassified bodies	.....	1,388,210
Total	.....	3,629,482

RECAPITULATION

	Population
Anglican Communion	28,806,060
Baptist Communion	24,173,427
Congregational Communion	4,404,903
Disciples of Christ	4,776,987
Lutheran Communion	62,280,086
Methodist Communion	34,767,645
Presbyterian and Reformed Communion	30,963,210
Other bodies	3,929,482
Grand total	194,101,800

HENRY K. CARROLL,
Author 'Religious Forces in the United States,' etc.

CHRISTIAN DOCTRINE, Development of. The evolution of Church doctrine, and with their slighter shades of meaning, of dogma, creed, precept and tenet, since the Apostolic Age. Church doctrine is based on truths contained in the Scriptures of the Old and New Testaments, Christian theologians recognizing in these Scriptures the depository of all knowledge necessary for the teaching of salvation.

Presented by a recognized authority,—a teacher, a school or a sect,—doctrine, as a principle or exact rule of conduct, which is to be considered true and obeyed on its own merits, differs slightly from dogma which is formulated as essential and to be accepted as authoritative.

In pre-Christian times, the precepts of Moses, Pythagoras and other teachers were considered authoritative by their followers. In 'Academic Questions,' Cicero records "decrees" or "doctrines" which the philosophers and teachers called "dogmata," and which it was criminal to doubt. The Mosaic ordinances are thus classed as Hebraic "decrees," or doctrines, in Ephesians ii, 15; Colossians ii, 14. The first Christian doctrinal and moral instruction given by the apostles was delivered by Peter, on the Sunday of Pentecost 30 A.D., a few weeks after the crucifixion of Jesus Christ, and the nucleus of the Apostolic Church was formed. Four years later, in face of persecution, through the martyrdom of Stephen and the conversion of Paul at Damascus, Christianity began to spread outside of Jerusalem, and from 34 to 44 made rapid progress through Palestine, Phœnicia and Syria as far as Antioch. Paul made his first missionary journey in 47–48, and at Pentecost in 49, disciplinary decrees and doctrines were formulated for future guidance by the Apostolic Council in Jerusalem. Between 49 and 64, Paul made missionary journeys to different parts of the Levant, including Spain, preaching the Christian gospel, twice undergoing terms of imprisonment at Rome, and writing the Epistles to the different churches and congregations, from which subsequent Christian doctrine was formulated. As generally accepted Paul and Peter were martyred at Rome by Nero in 67, and three years later, with the siege and destruction of Jerusalem in 70, Hebrew nationality ended. During the 2d century, however, Hebraic Christianity continued to spread, although diversity of opinion arose over points of doctrine among Ebionites, Docetæ, Essenians, Gnostics, Manichæans, and in Dynamic, Patripassian, Monarchian and Sabellian Unitarian circles. At Alexandria, Egypt, with its great universities, libraries, learned professors and throngs of eagerly inquiring and active-minded students,—where the Hebrew philosophy of Philo and the Greek teaching of Plato had blended with the doctrine of Moses and the prophets for a modified teaching of contemporary thought,—the first serious attempt was made by Christians to adjust the facts and truths of the gospel and the relations of Christian doctrine to reason and philosophy. Tertullian, 200 A.D., the first to apply the word "Trinity" to the conception or revelation (from human life) of the Triune Godhead, and Origen the Adamantine 185–254, spiritual as well as speculative in his outlook, are the commanding figures of the period. According to Justin Martyr,—the first of the great teachers to develop the doctrine of the Logos or the Divine Word which is God, incarnated in Jesus Christ,—the Gospels included in the New Testament Canon were being read in Christian assemblies on Sundays in 150 A.D. The circulation of apocryphal apostolic writings and the formulation of apocryphal canons to uphold their teachings had to be combated, and great weight came to be laid upon tradition as a source of evidence respecting the teaching of Jesus and the apostles. The principal churches were honored as the witnesses and trusted guardians of these traditions, and the authority of the acknowledged Scriptures was considered final and conclusive. Unity, holiness and catholicity became fixed doctrines of the ever-growing church communities over which the bishops presided, and the bishop of Rome as the acknowledged successor of Peter, the leader of the apostles and vicar of Jesus Christ, was head of the united Church. During the 3d century, the doctrines of Christianity had become such a power, that shortly after the opening of the 4th century, Constantine the Roman emperor-convert, by the Edict of Milan in 313, decreed the toleration of Christian worship throughout the empire and gave Imperial sanction to Church doctrine. Five years later, in 318, Arius of Alexandria, denying the doctrine of the Incarnation of Jesus as the Word which is God, was opposed by Athanasius "the father of orthodoxy," and the first ecumenical council of bishops convoked by Imperial decree from all the churches assembled at Nicea in Bithynia, 325. It culminated in the formulation of the Nicene Creed. In 381 the first ecumenical council of Constantinople reaffirmed the Nicene Creed in opposition to Apollinarianism (q.v.), a modified form of Arianism. In 431 the Council of Ephesus defined the doctrine that Mary was the Mother of God, which was opposed by Nestorius, bishop of Constantinople. In 451, the celebrated Council of Chalcedon, disciplining Eutyches, formulated the orthodox

doctrine of the Trinity which has ever since been regarded as the limit of human wisdom on this subject. In 589 the Council of Toledo, Spain, inserted *filioque* — and the Son — in the Creed, to affirm the procession of the Spirit from the Father and the Son. In 831 the doctrine of Transubstantiation (q.v.) was advocated by Paschasius Radbertus. In 870, the Greek Church under Photius, archbishop of Constantinople, separated from the Roman Church over the insertion, two and a half centuries before, of *filioque* in the Creed. Abelard (1079–1142), the greatest of scholastic philosophers, in concept and conceptualism applied psychology and logic to the Ephesian doctrine of 431. In 1409 the Council of Pisa attempted to heal the great schism which had existed since 1309 over the rival popes of Rome and Avignon; the abuses it entailed creating popular demands throughout all Europe for reform. In 1439, the Council of Florence formally sanctioned the seven sacraments of baptism, confirmation, unction of the sick, the Lord's Supper, penance, marriage and ordination. In 1517 the need for reform of abuses which had crept into Church practice culminated in Luther's protest, and Protestantism created that revival of religious feeling throughout Christendom which, by a reactionary influence, resulted in a reawakening of religious zeal within the Catholic body. (See REFORMATION and COUNTER-REFORMATION). With this dual Reformation came the division of Christian doctrine into Protestant and Catholic fields of thought. After 1530 appeared the Protestant confessions of faith, Lutheran, Anglican, Calvinistic, etc. Justification by faith, individual responsibility, the right to believe and worship according to one's conscience became the cardinal points of Protestantism. The Bible is the one rule of faith and practice; the decrees of any spiritual representative, of any body or convention, are not considered infallible or obligatory. Since then Protestant Christian doctrine has had innumerable expositors, discussing every possible shade of opinion. (See CHRISTIANITY; CHRISTOLOGY; CREEDS AND CONFESSIONS; INCARNATION; etc.).

The Council of Trent 1545–63, with the greatest deliberation and care, confirmed the Catholic position on doctrine. Since then the only additions considered necessary by the Catholic Church to give greater force to existing doctrine have been the formulation of the Ephesian definition of 431, conceptualised as the elevation of womanhood by Abelard 1079–1142, finally promulgated as the doctrine of the Immaculate Conception (q.v.) in 1854, and the Papal infallibility (q.v.) of doctrinal teaching, promulgated in 1870. Consult Newman, Cardinal J., 'Development of Christian Doctrine' (London 1878); Fisher, G. P., 'History of the Christian Church' (New York 1887). See also CANON LAW; DECRETALS.

CHARLES LEONARD-STUART,
Editorial Staff of The Americana.

CHRISTIAN ENDEAVOR, Young People's Society of, a society distinctly religious in all its features; organized 2 Feb. 1881, in Williston Congregational Church, Portland, Me., by the Rev. Francis E. Clark. From one small association it has expanded into more than 77,500 societies in all parts of the world, with an aggregate membership (1917) of 3,875,000. In addition to the main organizations in the United States it has been found necessary to form branches, among which are the Junior, organized 29 March 1883, by the Rev. Charles A. Savage, pastor of the First Congregational Church, Berkeley, Cal.; the Intermediate, organized 1891 by the Rev. A. Z. Conrad, pastor of the South Congregational Church, Worcester, Mass., and the Mothers', suggested by Mrs. Amanda B. Fellows, of Chicago, and organized in April 1893 at Topeka, Kan., by Mr. F. C. Barton. Among other special branches are the Floating societies for work in the United States navy and among seamen generally; and various other organizations whose fields of labor lie among the Chinese, the Indians, convicts in prison, etc. The first Christian Endeavor society in England was organized in 1887, and was followed by similar ones in other countries, and the constitution has been printed in more than 60 different languages. The movement is interdenominational and international, with societies in more than 80 denominations and 60 nations. Any society belonging to an evangelical church which adopts the leading principles as set forth in the constitution, including the prayer-meeting pledge, and which guarantees these principles by the name "Christian Endeavor," either alone or in connection with a denominational name, is admitted to all the privileges of the organization. In the United States the Presbyterian Church has the largest number of societies; in Canada and Australia the Methodists are in advance of all others. In some of the American States the Disciples of Christ, and in others the Congregationalists claim the largest number.

The distinctive features in the Christian Endeavor movement are its work among the young people, leading them to consecrate their lives to the active service of God; the weekly prayer-meetings, which each member takes a pledge to attend regularly (unless unavoidably detained), and to take a part in; the consecration meetings held once a month, at which special efforts are made to see whether each member has been faithful to his pledges; the committee work training the members in practical service; and the unions, city, county, district, State, national and international, which emphasize and illustrate the fellowship of the movement. The amount of good accomplished in training the young people in the practical work of Christianity and fitting them to take up the work of those dropping out of active service can never be fully estimated. The increase and efficiency standards set before the societies the most practical and helpful plans for definite religious training ever presented by any organization. As a result of this training it has enrolled (1917) more than 100,000 comrades of the Quiet Hour, who practise daily communion with God; more than 36,000 members of the Tenth Legion, who give at least one-tenth of their income to the service of God; more than 8,000 Christian Endeavor experts who have passed an examination on the history, principles and methods of the movement; more than 3,000 life-work recruits who have devoted their lives to the ministry, missions or some other form of Christian service, and more than 50,000 members of the International Peace

Union, pledged to promote the principles of brotherhood and fellowship among all nations. Christian Endeavor Week, the week in which the 2d of February occurs, was adopted in 1913 and is observed with appropriate exercises by the societies in all parts of the world. Through it a great impetus is given to all departments of the work.

The World's Union of Christian Endeavor has held conventions at Washington, D. C., in 1896; in London, England, in 1900; Geneva, Switzerland, in 1904; Agra, India, in 1909, and Chicago, Ill., in 1915, which were attended by representatives from all over the world. The United Society of Christian Endeavor is a bureau of information, which simply seeks to spread the idea of the movement throughout the world. Its headquarters are in Boston. *The Christian Endeavor World* is the international publication of the movement.

WILLIAM SHAW,
General Secretary.

CHRISTIAN ERA, the era or epoch introduced by the birth of Christ. It was calculated back about the year 532 by a monk, Dionysius Exiguus, a resident of Syria. It is thought that he fixed the advent too late by four years, and that consequently Jesus was born, if the contradiction in terms can be permitted, in 4 B.C., which is, however, the generally accepted date among Biblical scholars. They give the "probable dates" as follows: *Circa* 4 B.C.—Birth of Jesus; *circa* 28–29 A.D.—Beginning of public work; 30 A.D.—Death of Jesus. There are no historical data for determining the day of His birth; the Church after much vacillation finally settled on 25 December. The Christian Era is sometimes called the Dionysian Era.

CHRISTIAN KNOWLEDGE, Society for the Promotion of. The oldest and greatest of the religious associations connected with the Church of England. It is popularly referred to as the "S. P. C. K." It was founded in 1698, although it did not receive its present name till 1701, and had for its objects:

"1. To promote and encourage the erection of charity schools in all parts of England and Wales. 2. To disperse, both at home and abroad, Bibles and tracts of religion; and, in general, to advance the honor of God, and the good of mankind, by promoting Christian knowledge both at home and in other parts of the world by the best methods that should offer." These objects it has never ceased to pursue, directing its efforts chiefly to Great Britain and the colonies. It partakes at the same time of the nature of an educational association, a missionary society, a Bible society, a religious tract society and an emigrants' spiritual aid society. The publishing and bookselling business shows in some years total sales of $450,000; the works published being in very various departments of literature, and including several admirable series on Early Britain, Diocesan Histories, Ancient History from the Monuments, Early Chroniclers, etc.

The Protestant missionaries who labored in the south of India in the 18th century were supported chiefly by this society, and it is now chiefly engaged in supplying to the mission-field throughout the world needful religious literature in the vernacular. Besides translations of the Bible and Prayer-book, it provides for pioneer missionaries, grammars, dictionaries, reading-books and general literature to instruct them in the languages which they will have to use. In Scotland a similar society was organized in 1709.

CHRISTIAN AND MISSIONARY ALLIANCE. Christian Missionary Alliance was the title adopted when the Christian Alliance, which had been founded in 1887 and the International Missionary Alliance combined in 1897. All who have made open profession of belief in Christ may become members by subscribing to the principles of the order and enrolling their names. The objects of the Alliance are "Wide diffusion of the Gospel in its fullness, the promotion of a deeper and higher Christian life and the work of evangelization, especially among the neglected classes in distant heathen countries." Connected with the Alliance are the Missionary Training Institute, Institute for the Training of Home Workers, Berachah Home and Berachah Orphanage.

CHRISTIAN REFORMED CHURCH IN NORTH AMERICA, The. This Church is largely the result of three secession movements out of the Reformed (Dutch) Church (q.v.). The first of these movements took place in 1822 in the States of New Jersey and New York. Its leader was Rev. Solomon Froeligh, D.D., assistant professor of theology in the Dutch Church. The reasons advanced for seceding from the old denomination were its laxness in disciplining offending members, indiscriminate administration of sealing ordinances and toleration of Hopkinsian teachings. In 1827 the seceders, calling themselves the "True Reformed Dutch Church," numbered 25 congregations and 12 ministers. Their number dwindled slowly but surely until 1890, when they formed a union with the main part of the present Christian Reformed Church.

This main part was composed largely of Hollanders who, in 1847 and the decade following, had settled in Michigan, Wisconsin, Iowa and other northwestern States. In 1849 these people—all stanch Calvinists—had united themselves with the (Dutch) Reformed Church. From the very beginning, however, some were dissatisfied with the union on account of difference in language, neglect of catechetical preaching and teaching, too much fraternizing with un-Calvinistic denominations, the singing of hymns and laxity of doctrine. Objections were also made against allowing freemasons to be church members. In 1857 this dissatisfaction led to an open disruption. Under the leadership of the Rev. K. Vanden Bosch, about half a dozen churches in Michigan withdrew and styled themselves the "True Dutch Reformed Church." In 1876 they opened a theological school in Grand Rapids, Mich., the denominational stronghold.

This True Dutch Reformed Church was much strengthened, numerically and morally, by a third movement of secession which took place in the early '80's. This movement was the result of anti-Masonic agitation, the General Synod of the Reformed Church refusing to take such decided action as the complainants desired. In 1882 the seceding congregations, about half a dozen, led by Rev. L. J. Hulst, united formally with the Church which had withdrawn in 1857.

After this union the numerical increase of the denomination, which was slow at first, became quite rapid. The statistics for 1918 give 250 congregations, 175 ministers, 40,000 communicants, a total of 90,000 souls; about 25,000 catechism scholars and some 20,000 pupils in the sabbath schools. These congregations are scattered through the Northern States of the Union, several along the Atlantic Coast, from Massachusetts to New Jersey. In recent years a few have been organized in Washington and California. About half a dozen congregations are found in the Saskatchewan and Manitoba provinces of Canada, while four affiliated churches, supported by the denomination, are found in the Argentine Republic. The different local churches are joined in 13 "classes" or presbyteries. Six delegates of each of the latter, three ministers and three elders, constitute the Synod, the highest Church court of the denomination, meeting biennially (in even years), the third Wednesday in June. The Theological School and Calvin College, located in Grand Rapids, Mich., have about 350 students enrolled. The faculty is composed of 17 professors. The Christian Reformed Church is very zealous in home mission efforts. This is one of the main causes of its rapid growth; continual immigration from the Netherlands and the formation of new settlements supplying the material for the increase.

The denomination also carries on mission work among the Navaho and Zūni Indians in New Mexico. Near Gallup, N. M., "Rehoboth Missions," a flourishing boarding-school for Navaho children gives a Christian education to some 100 Indians boys and girls, while in Zūni a day school has 24 children enrolled. Five other stations, with Rehoboth as centre, are manned by ordained missionaries who labor in connection with governmental boarding-schools for Navahoes in New Mexico. Both in Paterson and in Chicago Rescue Missions are maintained; in the first named city a Jewish Mission Home of the denomination was opened in 1915, while in Hoboken, N. J. a Seaman's Home has been established. In Ogden, Utah, work is done among the Mormons. The free Christian primary schools found in all the principal Dutch settlements are supported largely by the Christian Reformed people, something which applies also to the Bethesda Sanatorium for tuberculosis sufferers in Denver, Colo., and the Psychopathic Hospital near Grand Rapids, Mich. The denomination has three official church periodicals, one in Dutch (weekly), one in German (monthly) and *The Banner*, an English weekly, dating from 1866 and published in Grand Rapids, Mich. This indicates that the Christian Reformed Church is a tri-lingual body. About half a dozen of its churches are German, the great majority use the Dutch tongue and about two dozen of churches employ the English language in their worship. This latter element is growing rapidly as a result of the natural process of Americanization constantly going on. Fraternal relations are established with the stricter Calvinistic Churches of the United States and South Africa, and especially with the Reformed Churches of Holland. In creed and government the Christian Reformed Church is like all reformed denominations of Holland origin throughout the world, its creed consisting of the Heidelberg Catechism, the Belgic Confession and the Five Articles against the Remonstrants, usually called the "Canons of Dordrecht." The Church is marked for its conservative spirit and contends earnestly for Calvinistic tenets. It lays much stress on catechetical training of its young people. The Psalms are used almost exclusively in public worship. The name "Holland Christian Reformed" was adopted in 1880 and 10 years later the official name became "Christian Reformed Church."

REV. HENRY BEETS.

CHRISTIAN SCIENCE. The religion, or interpretation of the Christian religion, discovered and founded by Mary Baker Eddy (q.v.). Christian Scientists regard it as the restoration and divinely promised fulfilment of the religion taught and practised by Christ Jesus. It is defined by Mrs. Eddy as "the law of God, the law of good, interpreting and demonstrating the divine Principle and rule of universal harmony" ('Rudimental Divine Science,' p. 1).

To the question, What did Mrs. Eddy discover? Christian Scientists answer that she discovered the law of God, the law of Life, Truth and Love, as well as the rule, the systematic method or practice, for demonstrating the Principle of harmonious being. Besides this she added immeasurably to the world's knowledge of spiritual reality as distinguished from material belief. Anyone who would understand Christian Science "must begin," says Mrs. Eddy, "by reckoning God as the divine Principle of all that really is" ('Science and Health with Key to the Scriptures,' p. 275). Whatever is the object or subject of thought, unless God made it, unless it expresses His being, it is illusive, destructible and unreal. This is the basis of Christian Science practice. On this basis the Christian Scientist works to purify human thought and to realize the truth of being.

The Christian Science definition of God is "incorporeal, divine, supreme, infinite Mind, Spirit, Soul, Principle, Life, Truth, Love" ('Science and Health,' p. 465). The word "Person" (spelled with a capital letter), is also used as a term for God, but Christian Science does not hold that God is like a human being. Of God it is said that "He is all-inclusive" ('Science and Health,' p. 331); which statement is to be regarded as consistent with the idea of imparted identity and individuality. Indeed, one of the leading points of Christian Science is that God is the Life, Mind and Soul of man, yet that man, as the reflection of God, possesses perfect identity and individuality. As understood in Christian Science, therefore, God creates man and the universe; He governs the individuality and continuity of each creature; and He maintains this infinite creation as the expression of His being.

Since Christian Science is based on the teaching and example of Jesus, it has a definite and emphatic view of him and his mission. To begin with, it distinguishes between Jesus and the Christ as between what is human and what is divine. In the authorized literature of Christian Science the word "Jesus" usually refers to the person whom Christian Scientists regard as Teacher and Way-shower. The word "Christ" may refer to him, to his spiritual selfhood, or to his office as the Messiah, Saviour or Christ. Usually, however, Christian Scien-

tists use the word "Christ" in an entirely impersonal manner, as Saint Paul sometimes used it. Thus Mrs. Eddy defines "Christ" as "the divine manifestation of God, which comes to the flesh to destroy incarnate error" ('Science and Health,' p. 583). As for the mission of Jesus, Christian Science finds the index to it in his description of himself as the Teacher and the Way. His teaching and example showed the way of salvation for all men and made him the Way-shower as well as the Teacher or Master. Accordingly, the system which he taught was called the Way by the early Christians. This fact appears frequently in the historical Book of Acts (ix, 2; xviii, 25–26; xix, 9, 23; xxii, 4; xxiv, 14, 22) and in some of the Epistles (Heb. x, 20; 2 Peter ii, 2). Originally, therefore, Christianity was, to quote modern translations of Hebrews and Second Peter, "the way which he (Jesus) dedicated for us, a new and living way," "the way of the truth." Christian Science, then, utterly rejects the doctrine that Jesus, by his death, paid a ransom to the devil and thus wrought the deliverance of those who believed on him. Christian Science likewise rejects the doctrine that the righteousness of Jesus was accepted by the Father as a substitute for the righteousness of mankind lost through the fall, and that the death of Jesus was accepted by the Father as an equivalent of the punishment justly incurred by mankind; men being consequently released from punishment, on condition of their acceptance through faith of his sacrifice. And of course Christian Science rejects the various refinements of these doctrines which have continued to the present day. Christian Science finds the supremely efficacious service of Jesus in his life, including his overcoming of death, as he himself said, "Because I live, ye shall live also." The way which he showed or dedicated was new, as distinguished from the substitutional sacrifices of the Old Testament. It was also living, for he overcame death with the full proof of life and immortality. Furthermore, he dedicated it for us; hence it is available to us, even as it was to him. So the pertinent tenet of Christian Science reads, "We acknowledge Jesus' atonement as the evidence of divine, efficacious Love, unfolding man's unity with God through Christ Jesus the Way-shower; and we acknowledge that man is saved through Christ, through Truth, Life and Love as demonstrated by the Galilean Prophet in healing the sick and overcoming sin and death" ('Science and Health,' p. 497).

Christian Science defines man as the image, likeness or reflection of God. Of course this is not an uncommon description of man; but Christian Science, defining God as heretofore stated, reasons consistently from cause to effect as Jesus did when he said, "That which is born of the Spirit is spirit." Christian Science does this in spite of all material evidence to the contrary, and declares with Saint John that "As he (God) is, so are we in this world." Such a conclusion must mean either that God is like a human being, or that the human concept of man is erroneous. Christian Science declares that the human concept of man is erroneous; that the human need is spiritual consciousness; and that human life becomes more divine as the true conception of God and man is realized.

Christian Science, therefore, distinguishes completely between the real, ideal man and the human or mortal sense of man. For this purpose and for every purpose, it distinguishes between ultimate or absolute reality and mere appearance, semblance or illusion. Acknowledging God as the origin of all that really is, Christian Science does not find an origin for aught else, but consistently denies that anything which is not of God can have an origin or real existence. Says Mrs. Eddy, "The mirage, which makes trees and cities seem to be where they are not, illustrates the illusion of material man, who cannot be the image of God" ('Science and Health,' p. 300). In this connection, Christian Science declares that Christianity was originally based on the truth or reality of being. Its basic requirement was the knowledge of the truth concerning God and man, "the truth" denoting absolute reality as opposed to which is merely apparent, seeming or false. Attention is drawn to sayings of the Master, such as the following: "For this cause came I into the world, that I should bear witness unto the truth." "I came that they may have life, and may have it abundantly." "This is life eternal, that they might know thee, the only true God and Jesus Christ, whom thou has sent." "Ye shall know the truth, and the truth shall make you free." Such sayings imply that the human or mortal sense of life is false, and they imply that abundant and eternal life is to be gained by finding and realizing the truth of being. The human situation was stated by Saint John in these words: "Beloved, now are we the sons of God, and it doth not yet appear what we shall be." He did not mean that we shall ever be different from what we really are. He meant that we are the sons of God, though the reality of being doth not yet appear. He did not foresee a loss of identity; he discerned the realization of true identity. Mrs. Eddy has consistently said: "The real, ideal man appears in proportion as the false and material disappears." "Mortals will disappear, and immortals, or the children of God, will appear as the only and eternal verities of man" ('Science and Health,' pp. 69, 476).

According to Christian Science, then, no form of evil possesses the nature of substance, but every phase of evil is only an aspect of error; truth or the understanding of reality being the universal remedy. For instance, take its teaching in regard to sin. Sin is primarily wrong thinking; it is always punished by the loss of harmony or the suffering which it entails; it is forgiven as it ceases, for goodness always receives its reward. The impulse to sin is always ignorant or deceitful; at worst it is a false sense of pleasure in sin. So Christian Science is spiritually educational; it makes much use of the truths that sin cannot confer genuine pleasure; that the consequences of conscious indulgence are cumulative; and that happiness must be sought and can be found in active goodness. This religion also emphasized the power of goodness — the ability which goodness carries to detect sinful motives, to unmask sinful inducements and to dispel sinful persuasions. In this manner the reformative work of Christian Science has been conspicuously successful.

The prevention and cure of disease is within

the mission of Christian Science for the same reasons that it was within the mission of original Christianity. What are disease and health? In the last analysis not only disease and health but mortality and immortality are opposite mental states, resulting from contrary modes of thought. On one hand is material sense, which has no principle — no cause or substance — and is simply an illusion, a dream of pain and pleasure in matter that includes sin, disease and death. On the other hand is spiritual sense, which is created and sustained by God, the divine Principle of all true being. What Saint Paul wrote to the Romans on this subject was both Christian and scientific: "To be carnally minded is death, but to be spiritually minded is life and peace." In these words he declared that life is a condition of mind or thought; he analyzed causation as wholly metaphysical. The mentality which sickens and dies is carnal; that is to say, material; while the thought which lives and enjoys the perfect attributes of life is spiritual; that is to say, emanating from Spirit or God. In other words, it is Spirit, God, the divine Mind, that gives life and health to man, and gives it through mentality or thought. Health, therefore, is primarily a mental and spiritual quality, and it is to be gained and preserved as such; that is, through the understanding of and obedience to the spiritual law which emanates from the divine Mind. Disease, on the other hand, even the most physical disorder is a palpable evidence of false belief. It is a condition incident to the supposition that man is a material selfhood and governed by a law of suffering, disability and death — governed by laws which divine Life, Truth and Love could never make. Every lack of health, from beginning to end, is only a subjective condition of mortal thought; it is a particular result of the general supposition that life inhabits matter and is mortal. Christian and scientific treatment of disease, then, depends on the distinction between absolute or real being and the human or mortal concept of man. Freedom from disease follows the absolute knowing of the truth concerning God and man. To cope successfully with disease it must be resolved into false belief and dealt with on a mental plane, in accordance with the divine law by which Truth destroys error. Healing comes to pass when the supposed law of disease and death is broken by the actual law of Life, and the unity of being is such that one individual can help another to obtain this victory. In so far as hygiene and sanitation denote cleanliness and purity, Christian Science is in full accord; and it commends not only a clean body and clean surroundings, but a clean mentality; not only pure food, but pure thoughts. Jesus intimated to the Pharisees that for outward cleanness to be more than superficial it must be the result of inward cleanliness.

Christian Scientists usually conduct their own charities, and they contribute funds with an ease that is remarkable to observers. During the Great War, for instance, Christian Scientists have contributed and expended relatively large sums for the relief of sufferers from the war, both before and since the United States entered it; and they have carried on a varied and systematic work for the welfare and comfort of soldiers and sailors in this and other countries.

The Church of Christ, Scientist, or Christian Science Church, was organized at Boston in 1879. It consists of The Mother Church, The First Church of Christ, Scientist, in Boston, and branches thereof throughout the world. The number of regularly organized congregations in April 1918 is 1,766, of which 1,582 are in the United States. The governing body of the denomination is the Christian Science Board of Directors; but each congregation has its own self-government.

The Christian Science Publishing Society publishes Mrs. Eddy's writings (see bibliography at end of article under EDDY, MARY BAKER) and issues the following periodicals: *The Christian Science Quarterly Bible Lessons*, a quarterly containing the "lesson-sermons" which are read in the Sunday services of this denomination; *The Christian Science Journal*, a monthly accompanied by directories of churches and practitioners; *Der Herold der Christian Science*, a monthly published with alternate pages in English and German; *Le Heraut de Christian Science*, a monthly published in English and French; *The Christian Science Sentinel*, a weekly; and *The Christian Science Monitor*, an international daily newspaper. This paper, founded in 1908 by Mrs. Eddy "to injure no man, but to bless all mankind," has now become well known wherever the English language is spoken.

CLIFFORD P. SMITH,
Committee on Publications, Boston.

CHRISTIAN UNION CHURCHES, a small body of Christians, organized in 1861, partly in protest against the preaching of politics. Rev. James F. Given, who left the Methodist Church in 1860 because the Civil War was advocated from its pulpits, drew together those who were of his way of thinking and they organized the Christian Union, at Columbia, Ohio, in 1861. Their principles are: (1) Christ the only head of the church; (2) the Holy Bible the only rule of faith and practice; (3) good fruits the only test of fellowship; (4) each local church to be self-governed; (5) the union of all Christians as an ideal; (6) political preaching discountenanced. Its doctrines are Evangelical. Its representative is *The Christian Witness*, Excelsior Springs, Mo. The denomination is strongest in Ohio and Missouri. In 1916 it reported 16,825 members, with 365 ministers and 330 churches. Consult Carroll's 'Religious Forces of the United States' (1912).

CHRISTIAN UNIVERSITY, a coeducational institution in Canton, Mo.; organized in 1853, under the auspices of the Disciples of Christ; reported at the end of 1915: Professors and instructors, 16; students, 72; volumes in the library, 10,000; grounds and buildings valued at $40,000; productive funds, $20,000; benefactions, $3,000; income, $5,000; number of graduates, 287.

CHRISTIAN VIEWPOINT OF THE ORIGIN AND DESCENT OF MAN. See MAN, CHRISTIAN VIEWPOINT OF THE ORIGIN AND DESCENT OF.

CHRISTIAN WOMAN, A, a novel by Emilia Pardo-Bazán. In this interesting tale the author presents a very realistic picture of modern Spanish life, into which are introduced many current social and political questions.

CHRISTIAN YEAR, The. 'The Christian Year,' by the Rev. John Keble is a series of poetical compositions or "thoughts in verse for the Sundays and holy days throughout the year." In other words it represents an attempt to make poetry an instrument of religion; in consequence, the writer is interested more in the religion than in the poetry. The work was intended to be an aid to the reader of the Book of Prayer of the Established Church of England; its object, in the words of the author, "will be attained if any person find assistance from it in bringing his own thoughts and feelings into more entire unison with those recommended and exemplified in the Prayer Book." It has, also, an historical significance, inasmuch as it "still remains the most satisfactory expression in poetry of the spirit which inspired the Oxford Movement." Although it does not contain the best of Keble's poetry, it is the work by which he is most widely known, and by which, in all likelihood, he will be chiefly remembered. When published in 1827, its success was immediate. It was, and doubtless remains, the most successful series of religious poems ever published. Before Keble's death in 1866, 95 editions were called for; before the end of 1867, the work had run into 109 editions — the editions in each case varying from 3,000 to 5,000 copies. It is still popular.

It is not difficult to account for the success of 'The Christian Year.' The different poems expand, elaborate, and illuminate some of the most familiar and most cherished Scriptural scenes, events and texts. It is doubtless true that most people are not "athletic readers"; that most do not think strenuously, or use their imagination effectively, while they are reading. A substitute, or aid, such as Keble supplies, does not ordinarily fail to attract attention and gain wide currency. There is, also, in 'The Christian Year' enough of true poetic quality to sustain the whole; in general, Keble's taste is "on the side of the angels." 'The Christian Year' is a kind of poetical analogue of the Rev. Samuel Rutherford's 'Religious Letters.' Certain devout souls are pleased with such rapturous expression; other souls, just as devout, but more reserved, are displeased. It has been said that "the poet of 'The Christian Year' sinks not infrequently to the commonplace. . . . He lacks the art to conceal art; or, better, the glow of feeling which effects the concealment unconsciously. A little coldness is the defect of his verse, just as it is the defect of a most amiable and virtuous life." The interested student will find John Campbell Shairp's criticism in the *North British Review* well worth reading.

WALDO H. DUNN.

CHRISTIANA CASE. On 11 Sept. 1851, Edward Gorsuch of Maryland, his son, a party of friends and a United States deputy marshal, having secured a warrant from a Philadelphia commissioner for the arrest of a fugitive slave (alleged to have been Gorsuch's own son), came to Christiana, Lancaster County, Pa., approached the house where the fugitive had taken refuge and demanded possession of him, firing two shots at the house. The neighborhood was aroused, and several armed colored men appeared on the scene, as also did Castner Hanway and Elijah Lewis, Quakers, who tried to persuade both parties to disperse. The deputy marshal ordered them to join his posse; they urged him to withdraw for his own sake; Gorsuch and two of his party fired on the colored men, who returned the fire, killed Gorsuch and his son, and forced the rest to fly. The fugitive slave escaped. The two Quakers were indicted for treason; the grand jury found bills against them; and they were tried 24 November before Justice Grier of the Supreme Court. Among the counsel for their defense were Thaddeus Stevens and T. L. Cuyler; the chief argument was by J. M. Read. The absurdity of the accusation was so great that the Democratic judge charged emphatically for the prisoners, and the jury acquitted them without leaving the box.

CHRISTIANCY, Isaac Peckham, American editor and diplomatist: b. Johnstown (now Bleeker), N. Y., 12 March 1812; d. Lansing, Mich., 8 Sept. 1890. He was one of the founders of the Republican party and espoused its cause as editor of the *Monroe Commercial*. In 1875 he was chosen United States senator from Michigan and in 1879 became Minister to Peru.

CHRISTIANIA, krēs-tē-ä'nē-a, Norway, capital, city and port, province of Aggershuus or Christiania, at the head of the long narrow inlet called Christiania Fjord, about 60 miles from the open sea or Skager Rack. High hills rise around it on both sides, excepting toward the bay, but at considerable distances, particularly on the north. The most interesting building in the town is the fine old castle of Akershus (built about 1300), with its church and planted ramparts crowning a point jutting out into the fjord and commanding a fine view, but of no military value. It now serves as an arsenal and prison. On a gentle elevation and in the midst of a beautiful park stands the royal palace — a massive square building, without any architectural ornament, but commanding delightful views of the fjord and its beautifully winding shores. The hall in which the Storthing holds its sittings is a very plain building. The other public edifices are the military academy, cathedral, university, etc. Attached to the university is a museum, containing a fine collection of antiquities. The climate of Christiania is delightful. It is screened from violent winds; and even in winter, though the cold is severe, the weather is seldom variable, but bright and settled and free from damp and fog. In summer it is warm but not sultry, with a light and buoyant atmosphere. The few manufactures of the city consist of woolen cloth, furniture, liquors, iron-ware, tobacco, paper, leather, soap, spirits, glass, etc. There are also some extensive breweries. The exports are principally timber, deal planks and iron. The environs of the city are exceedingly beautiful, the approach to it by the magnificent fjord, at the head of which it is situated, exciting the admiration of all visitors. The fjord is frozen for upward of two months in the year, for about 20 miles from Christiania to the sea; and the harbor is kept open by means of ice breakers. Christiania forms a separate official district and is administered by a magistracy composed of the burgomaster and two councilmen. It has good waterworks and several electric-car lines. The educational institutions include, besides the university, two higher military schools, a gymnasium, a technical school and a number of Latin schools and Realschulen. The

Museum of Art contains many meritorious paintings by Scandinavian and foreign artists, but no great masterpieces. The Industrial Art Museum has fine ancient and modern specimens of Norwegian handicraft. There are three theatres and a municipal library of 55,000 volumes. The city was founded in 1624 by Christian IV, on the site of the town of Oslo, which dated from 1048 and was burned in 1624. Pop. 247,588. Consult Annéus, 'La ville de Kristiania, son commerce, sa navigation et son industrie: Résumé historique' (Christiania 1900).

CHRISTIANIA, Universty of, the state university of Norway, founded under Frederick VI, in 1811–12. Previous to that time during the union of Denmark and Norway, Norwegian students went to Copenhagen for their university training. The awakening of the national spirit demanded that an institution of higher learning be established at home. It was started by voluntary subscriptions and during the 19th century both the state and individuals contributed to the erection of many buildings. The institution is controlled by the Ministry of Religion and Education. The library contains about 500,000 volumes; there are a botanical garden and an observatory. The student enrolment is about 1,600.

CHRISTIANITY. Christianity is a name for the religion which was founded by Jesus Christ. At first it was regarded as an heretical sect of Judaism, and, in appearance, it was little more. Its Founder was a Jew who always spoke with respect of his ancestral religion, attended upon its worship and reverenced its sacred books. Its earliest adherents were Jews who were devotedly attached to the traditions and customs of their people, and who were far from supposing that in becoming disciples of Christ they were taking a step which would, at length, separate them from the religion of their fathers.

It is, indeed, a matter of dispute whether Jesus himself contemplated such a result. Some believe that he hoped to do the work of a reformer and to induce the Jewish people to adopt his religious ideals without separating himself or his disciples from the congregation of Israel. In view of all the circumstances this supposition seems improbable. The ritualism and traditionalism of late Judaism and the radical ethicism of Jesus were too diverse to admit of reconciliation. As he himself expressed it, his countrymen who were accustomed to the old wine of Jewish thought and custom would not straightway desire new, and his teaching was new wine which would not be confined in the old wineskins of Judaism (Luke v, 37–39). Accordingly, the separation which Jesus' experience at the hands of his countrymen had betokened became more and more complete as time went on. The teaching of men who discerned and emphasized the contrast between Judaism and Christianity — especially that of the apostle Paul — the intense missionary spirit of the early Christians and the downfall of the Jewish state in 70 A.D., were among the circumstances which completed the separation of the two forms of faith and started Christianity on its career as one of the great world religions.

In speaking of the religion of Christ, we must refer primarily to his own teaching and that of his early disciples. This we may the more properly do since all Christians agree that for obtaining a knowledge of the principles of their religion recourse must be had to the writings of the New Testament as being, in some sense, primary and formative. Despite the differences of opinion which have obtained in the Christian world, there are certain great, general convictions which Christians share in common and which may be said to underlie or constitute the claims of the Christian religion on its own behalf.

Chief among these claims is this, that the unique personality, teaching and influence of Jesus Christ give to him a supreme place among the religious teachers of the world. All Christians would assert the incomparable elevation and excellence of the morality which he taught and illustrated, and would maintain that the influence of his example upon the life of the world has been most salutary. They would agree that a revelation of God is to be seen in the person and lifework of Jesus, however widely they might differ as to the method, nature and scope of that revelation. It is a general Christian conviction that the moral effects of Christianity in the world have been such, on the whole, as to constitute an evidence of its divine origin and character. These introductory considerations must now be further elaborated.

Christianity and Christ. — How did Christ become the Founder of a new religion? We must answer: By the personal influence and inspiration which he exercised upon those who associated themselves with him. He did not adopt the methods of the political organizer. He created no party; led no uprising; elaborated no formal program. Other founders of religions have generally been the authors of elaborate books of rules and doctrines; Jesus wrote nothing. He was not an organizer or an aggressive leader of men. He advocated no revolution, except the moral revolution of the inner life. He moved quietly about along the highways and among the villages of Galilee and Judea, speaking to men about God and life and duty, and thus initiating a movement which has transformed the world.

The secret of this movement doubtless is that in his teachings and life Jesus touched the deepest chords in human nature. He sounded the profoundest depths of man's moral and spiritual being. The conception of God which he portrayed, the ideals of life which he illustrated, were the highest and truest of which men can conceive. Such has been the conviction which he has inspired. However far men might fall below the morality of Christ, however much they might deny his principles in practice, they have still been haunted by the feeling that his words were true. In the depths of their hearts men, despite their cruel selfishness, have recognized in the voice of Jesus the tone of absolute truth.

Our most primitive sources of information assure us that Jesus taught something regarding himself, as well as something regarding God and man. The Gospels assume that this latter aspect of his teaching is inseparable from the former. He assumed to speak to men about the fatherhood of God out of a sense of his own unique sonship to him. He told men what God was and required because he claimed to possess

an incomparable knowledge of God's nature and will. If we can trust the earliest reports of his teaching, we must say that he never separated his message from his personal claims as the bearer of it. However unwarranted the historic theories of Christ's person may have been, they sprang from a legitimate impulse. The Christian religion implies and necessitates some theoretic estimate of Christ.

Christianity and Scripture.— Christianity has sometimes been described as the religion of a book. It would be more correct to say that it is a religion with a book. It is certainly not a book-religion in the sense in which Mohammedanism or Confucianism is. It does not appear, as it were, ready-made in the writings of any single sage or prophet. Its sacred books are its products, not its cause. Its program was not first elaborated in a book and then carried out in life and action. Christianity did not begin with a body of rules or laws. It is, or, at any rate, originally was, a religion in which motives and principles are primary and whose nature it is to create its own externals.

Nevertheless, the conception that the religion of Christ had its chief source and warrant in a book has often been maintained, and still has a wide popular acceptance. A similar view prevailed in Judaism concerning the religion of Israel. The Mosaic law was believed to have had its origin in heaven and to have prescribed, by divine authority, the complete religious duty of man. This law was the antecedent warrant for all that was to be believed and practised. This conception of an authoritative book in which the laws and principles of the system were incorporated in advance was transferred to the earliest Christian writings and became the popular working theory of the subject.

Nothing is plainer, however, than that such a view, alike of the Hebrew and of the Christian Scriptures, is quite unhistorical. The Mosaic law was a comparatively late codification of rules and maxims which were developed and collated through a long period of time. In its present form it was later than the preaching of the great prophets whose teaching represents the high-water mark in Israel's religion. In like manner the writings which compose our New Testament were produced after Christianity had been, for a considerable period, a vigorous force in the thought and life of the world. Its oldest books, the earlier letters of Paul, were incidental products of his missionary activity. They were addressed to individuals, particular congregations or groups of congregations, and deal largely with local conditions. They could not have been written with the remotest thought, on the part of the apostle, that he was contributing to an authoritative canon of Scripture. They were doubtless highly prized and carefully preserved by their recipients, yet not carefully enough to prevent several of them from being lost. At first they were not thought of as sacred Scripture — they were not placed on a level with the Old Testament, for example; that character they acquired only afterward when they became available in various controversies for the refutation of heresy.

We have reason to believe that the words of Jesus were carefully treasured from the first and the various early efforts to preserve them in writing were the germs of the New Testament canon. They were probably preserved for a generation or more in oral tradition only and after various redactions and compilations took form in our present Gospels toward the end of the 1st century. Speaking broadly, then, we may say that the New Testament is the earliest available literary product and record of primitive Christianity and possesses unequaled historical and practical value because it acquaints us most closely with Christ and with the first effects of his work in the world. The New Testament contains the original documents of the Christian religion.

Its Theological Basis.— Christianity is one of the great monotheistic religions. In general, its theistic presuppositions were derived from Judaism, on whose soil it took its rise. By its monotheism it is differentiated at once from polytheistic religions, such as those of ancient Greece and Rome, and from pantheistic systems, such as Brahmanism and Buddhism. In common with Judaism Christianity rests upon the conviction of the personality of God. All those vague and infra-personal descriptions, of the source and ground of all things which have been advanced as essentially equivalent to the Jewish and Christian ideas of God, such as "a power not ourselves" and a "stream of tendency," fall utterly short of the idea of God portrayed in the Old and New Testaments. Such philosophical terms as "ultimate reality" and "ground of the world" are useful, but non-committal on the point of prime importance. Christians believe that the fundamental reality is Spirit; that the ground of the world is personal.

So far all Christians would theoretically agree. When, however, we proceed to inquire as to the moral character of God, Christian speculation illustrates wide diversities of view. Men necessarily represent God to themselves by means of analogies drawn from their own life and experience. Hence in different ages, with their differing ideals and standards of life, various human analogies have been used to picture forth the nature and attributes of Deity. The Christian idea of the one personal God, at once gracious and holy, has, accordingly, varied in its form from age to age or within the same age among people of differing inheritance and culture. Now one aspect or attribute of his nature has been magnified, now another. But amidst all such divergences of emphasis, there has been a continuous and constant effort to conceive the character of God according to the highest ethical standards, and to represent him as embodying in himself all possible moral perfections.

Many modern Christian divines hold that the truest and most satisfying analogy with which to describe God is that which Jesus chiefly employed, namely, that of fatherhood. His favorite name for God was the Father. The descriptions which he gave of the nature and action of the Father show that for him fatherhood meant original, self-imparting, all-embracing love. Hence the apostolic summary of the Christian doctrine of God: "God is love," is true to the thought of Jesus. The kindred formulæ: "God is spirit," that is, of a spiritual nature, as opposed to what is material and local, and: "God is light," that is, perfect purity and beneficence, emphasize special aspects of God as fatherly love. The specifically Christian idea of God is best expressed by saying: God is Father; God is love.

Christianity and Judaism.— Historically speaking, Christianity arose out of Judaism. Jesus declared that he had not come to destroy, but to fulfil, the law and the prophets. According to the Fourth Gospel he summarized the relations of his work and teaching to the religion of Israel by saying: "The (Messianic) salvation is from the Jews." There is no fundamental doctrine of Christianity the germs of which are not found in Judaism. Christianity presupposes the ethical monotheism, the views of the world and man and the ideals of righteousness which underlie the preaching of Israel's greatest religious teachers, the prophets. The New Testament uniformly regards the gospel as an unfolding, a development from the Jewish religion, and this view is amply justified by a critical study of both religions.

But are they, then, two different religions? Are they not merely two branches growing on the same stem? The differences appear by considering how much in Judaism Christianity discards. In Israel Church and State were one. The state had no existence except in and through its religious constitution. Israel's great peculiarity was that it conceived itself to be a theocracy, a people whose real king was Jehovah. Now Christ, in his teaching, entirely disregarded this civic organization of the forces of religion. His teaching was wholly ethical and spiritual. He framed no constitution, enacted no laws; he did not even formally provide for an outward organization. Many Christians, indeed, hold that the creation of a closely compacted organization, a new kind of theocracy, was implicit in the principles of Jesus and was the legitimate and necessary outgrowth of his work; but however that may be, it cannot be shown that, in any direct way, he concerned himself with matters of outward organization and policy.

To the ritualistic system which was so prominent a feature of Judaism, Jesus only incidentally referred. As we have seen, he made no violent break with this system; it is a fair inference that he continued to attend upon the temple worship. But he laid no stress upon a ritual which had acquired increasing importance in the later history of Judaism, and even depreciated it. Like the Old Testament prophets, he does not commend sacrifices, but teaches that the most commonplace moral duty is more important. The most sacred rite of all, the badge of Israel's separation from the rest of the world, circumcision, he never even mentions. From such considerations it is evident that the gospel of Jesus is no mere reproduction of Judaism.

There are many other differences kindred to those which have been mentioned or growing out of them. Christianity is not, in the view of its Founder, a legal religion. It is a dispensation of inner, not of outer, law. In this respect its closest analogue in Hebraism is the teaching of the prophets. The New Testament writers see in the gospel the fulfilment of the prophecy that the new covenant should not be like the old; that the chief mark of the Messianic era should be that God would write his law on the heart. Hence Christianity finds its norm not in statutes, but in a personal life in which it beholds all its motives operative and all its principles illustrated.

The Relation of Christianity to Other Religions.—The principle which the Founder of Christianity announced when he said that he had not come to destroy but to fulfil was not applicable solely to Judaism. Jesus recognized goodness and truth under whatever form of religious belief or practice it might be found. While it is true that he saw in Israel's life and history a unique revelation of God and recognized in the Jewish Scriptures the product and record of that revelation, it is also true that he found a revealing and saving activity of God outside Judaism. He could see in the nobility and generosity of a heathen soldier a faith not matched in all Israel. He had other sheep who were not of the Jewish fold whom he would bring into the one flock. In the opinion of many interpreters the judgment parable in Matthew xxv is intended to describe the testing of the heathen, many of whom are accepted because they have shown the spirit of love and service; having done kindness to Jesus' fellowmen, they are regarded as having done it unto him.

The primitive Church more or less fully apprehended this conception of the relation of the gospel to other forms of religion. Paul declared that God had not left himself without a witness among any people; that he had made of one blood all nations of men; that the Greeks had been seeking after God and that there was a law of God written in the hearts of all men. The apostle recognized elements of truth in the crude beliefs and worship of the heathen. Despite their ignorance, he saw in their more than ordinary religiousness an evidence of a sincere aspiration after God and in their devotions and moral judgments a proof of their native kinship to him.

These views obviously rest upon the conception that, in some real sense, revelation is universal. God's eternal power and divinity are known to mankind, says Paul, because God has made these truths known to them. Other New Testament writers teach the same in other terms. In the Fourth Gospel Christ is identified with the Logos of Greek speculation. Accordingly in his preincarnate activity he is conceived as the medium of a universal revelation. Like an eternal sun he has been shining down into the world's darkness and sin, enlightening the mind of every man. He was operative in the life of Israel of old, however blind this favored people may have been to his presence. Paul expresses allegorically the same thought when he says that the spiritual rock of which the Israelites drank in the wilderness was Christ. But this action of the pre-existent Christ was not exceptional. He was the light of men universally. "His writing is upon the wall, whether of the Indian fane, or of the porticos of Greece." (J. H. Newman). From these various forms of thought and of expression it is seen that Christ and the early Christian teachers recognized truth in other religions than Judaism and Christianity and regarded the teaching and work of the Founder of the Christian religion as a clarification and completion of such truth. Christianity builds on the constitutional religiousness of man, upon his native and persistent sense of God, which it aims to enlighten and to quicken into a rational, moral faith.

The Doctrinal Contents of Christianity.— What has been said concerning the early history of Christianity, its monotheism and its estimate of Christ, may serve as a point of begin-

ning for a somewhat fuller illustrative statement of its doctrinal contents. As we have seen, Christianity inherited the monotheism of Israel, but gradually developed it by the elaboration of the doctrine of the Trinity. The motives to this development were chiefly two: (1) The primitive Christian estimate of the person of Christ, and (2) the Biblical teaching regarding the Spirit of God. Instead of conceiving of God as a simple, distinctionless essence, speculative thought began to analyze the divine nature until in the 4th century an elaborate theory of a threefoldness in God appears. In this Nicene or Athanasian form of thought God is said to consist of three persons, Father, Son and Holy Spirit, all equally eternal, powerful and glorious. It was held that this tripersonality of God is not inconsistent with monotheism, since the Father is the *fons et origo* of Deity from whom the Son and Spirit are derived by an eternal process of generation, and because the divine Essence is one. The doctrine thus included these three elements: (1) The coequal eternity of the three persons; (2) the subordination and derivation of the second and third from the first; and (3) the consequent oneness of the divine Nature in which all three persons alike partake.

It would carry us beyond the purpose of this article to dwell upon the various arguments and analogies by which it was sought to illustrate the nature of this tri-unity in God, or to describe the varying types of theory which were elaborated in subsequent theological discussion. Those who desire to pursue the subject further can do so by the aid of such standard treatises as Neander's or Milman's 'History of the Church,' or Fisher's 'History of Christian Doctrine.' The various forms of Trinitarian belief are sketched and discussed in Prof. L. L. Paine's 'Evolution of Trinitarianism.'

The orthodox doctrine of incarnation was that the Son, the second person of the Trinity, united himself with "human nature"—sometimes defined as impersonal, sometimes as personal. "Two whole, complete natures in one person," was the formula. In modern times these definitions have been modified or rejected by those who have adopted a different philosophy of the Trinity from that on which the definitions proceed.

Amidst the many diversities of opinion and theory the great common conviction of all Christians is that Jesus Christ is the supreme Revealer of God and the Saviour of men. The manner in which he effects their salvation has been variously explained and illustrated according to the conceptions entertained at different times of the ethical character of God. But whether Christ was believed to have paid a debt of honor to God or to have experienced a vicarious punishment for us, or to have safeguarded the divine government, or to have furnished a supreme example and incentive to goodness—in all these and other theories of atonement he is recognized as the Way to the Father.

These few statements respecting three great doctrinal topics may serve as illustrations of the historic theories which have been, in some cases, sanctioned by ecclesiastical authority, and, in others, rendered almost equally binding by tradition, and of their modification by the application to them of modern historical and philosophical methods of investigation and thought

Its Ethical Character and Requirements.—While, officially considered, Christianity has had the character of a doctrinal system, with its authorized theories and binding beliefs, practically its chief value and power have lain in its ethical teachings and influence. Theologians have placed great stress upon the various formulas and definitions which have been elaborated from time to time, but of these the vast mass of Christians have never had more than the vaguest knowledge. Dogmaticians have often held that Christianity was primarily a body of officially defined doctrines, but for most believers it has certainly not been such but rather a series of moral duties and requirements—a certain line of action or kind of life.

This view of Christianity is more germane to the teaching of Jesus than the dogmatic view. He promulgated no creed, elaborated no system, championed no set of formulas. His teaching was doctrinal in the sense that there underlay it certain conceptions of the moral nature of God and man and a certain view of their relations. But Jesus advanced no such technical theories on these subjects as were developed in later Christian thought. Metaphysics, in general, was foreign to the Jewish mind. Hence the teaching of Jesus naturally moved wholly in the ethical sphere. His teaching about God concerned itself almost wholly with the moral character and disposition of God. This character he illustrated by practical, human analogies.

Jesus' favorite name for God, as we have seen, was "Father"; that is, original, creative and sustaining love. In that conception of God the whole ethical character of his religion is rooted. The Father delights to give, to serve, to bless. He bestows his benefits upon all, even the evil and unthankful. He freely forgives, upon repentance, not only "until seventy times," but "until seventy times seven." Now, the primary requirement of Christianity is that men should be like God; or, as Jesus expressed it, that they should be sons of their Father; that is, morally kindred to him in spirit and action. Jesus represented himself as having come into the world to reveal God in this character and perfectly to illustrate in himself the Godlike type of life. He would be servant of all; he came to minister and to give his life for others. His followers must do the same. They must take up his cross of sacrifice and self-renunciation and follow after him. As he laid down his life for men, so must they lay down their lives for one another.

With all its faults and failures, despite its divisions and bitter enmities, Christianity has done much to leaven the world with the spirit which its Founder thus described and enjoined. It has cared for the sick and the poor, instructed the ignorant and sheltered the helpless. To education, to literature and to art the Christian religion has imparted a powerful impulse. No impartial student of history can question the great contribution which Christianity has made to human progress in culture and philanthropy.

Its Various Forms.—The theological controversies of the early Christian centuries, together with the political rivalries of Rome and Constantinople, finally rent the Church into two divisions, the Western or Latin, with the bishop of Rome as its head, and the Eastern, in which

the patriarch of Constantinople was the chief dignitary. Out of the same controversies also grew a number of sects and national churches which still survive, such as the Coptic, Ethiopic and Armenian. Down to the Protestant Reformation in the 16th century the two chief forms of Christianity were the Oriental, now represented by the Greek and Russian Churches, and the Roman Catholic. In the West the claims of the papacy were gradually increased until the Pope rivaled in political power the greatest European emperors. There was no corresponding development in the East, where the Church became more and more dependent upon and subservient to the states with which it was allied. The Eastern Church was differenced from the Western by a more speculative and less practical tendency, the favorite themes in the theology of the former centring in the doctrine of the Trinity, those of the latter having more largely to do with sin and salvation. Both developed an elaborate ceremonial of which the mass is the central feature.

At the Reformation, or in consequence of its influence, the various divisions of Protestantism arose. Some of these, for example, the English Church, continued in alliance with the state; others repudiated any such connection. The Church of England retained the Episcopal system and laid increasing stress upon its continuity in organization with the Church of apostolic days. Most Protestant communions rejected this order along with other features of the Roman organization, and attached no importance to the question of so-called tactual succession. Among these the greatest variety of belief and practice prevails.

It is quite impossible adequately to characterize in a brief statement the various forms of belief and life which the Churches and creeds of Christendom illustrate. In general, it may be said that the Roman type represents a highly elaborated, authoritative system. The decrees of popes and councils are binding, and, indeed, within certain limits, infallible. There is a highly developed and minutely defined system of dogma and an elaborate ritual. Great stress is laid upon the prescribed rites of the Church and upon priestly mediation. Salvation is mediated through the sacraments, which are seven in number. In the English Church we see an intermediate form. Its head is not the Pope, but the king. In general, it highly esteems the decrees of the early councils and lays great stress upon the (two) sacraments, but, in practice, does not compel the unquestioning acceptance of the former, nor regard the latter as essential to salvation. Most other Protestant bodies, such as Baptists, Congregationalists, Methodists and Presbyterians, permit and exercise a larger liberty regarding traditional beliefs and rites, some of them, as the two former, having no general authoritative creed, others, as the two latter, allowing considerable liberty in the interpretation of their official articles of belief. In general, it may be said that in Protestantism the prevailing tendency of thought is to regard Christianity as not being a system which can be embodied in rules and enforced by laws, but as a religion whose nature it is to attest itself to reason and conscience by its moral appeal to the human mind and heart.

The Essential and the Transient in Christianity.—What facts and truths constitute the essence, the permanent substance of Christianity? That is a difficult question and one which Christian thinkers would answer in the most various ways. Certain it is that in its long history Christianity has undergone many transformations, been influenced by a great variety of foreign forces and taken up into itself many incongruous elements. In its Roman Catholic form it blended with the Roman Imperial idea. In its most elaborate developments of dogma it wrought in close alliance with Greek philosophy. Some of its doctrines have been examples of a christianized Platonism. Are these features of historical Christianity essential to it?

The same question meets us if we go back to the Church of the first age. The common view has been that every idea which is found in the New Testament is of the essence of Christianity; but this supposition is not without its difficulties, and was probably never consistently carried out in practice. Were the apocalyptic expectations of the first Christian century valid and essential — the universal belief in Christ's speedy personal return to earth to judge the world, the confident anticipation of Rome's early destruction and the like? A close study of early Christian history reveals the fact that the admixture of foreign elements with primitive Christian teaching was not limited to the later ages of the Church. Christian doctrine had already undergone a considerable development within the New Testament period. Greek ideas and, especially, late Jewish theories and speculations, must be taken into account in interpreting and estimating apostolic and post-apostolic teaching and tradition.

If Christianity be regarded as a certain kind of life — if it be conceived as sonship to God, membership in the kingdom of the *Godlike* — then we cannot say that any one particular form of church organization is essential to it. True Christianity is formed within all these *forms of* organization. Except in some purely human, arbitrary definition of it, it cannot be truly said that divine grace is the special prerogative of any one of them. Nor can any theory or practice concerning the sacraments, or other rites, be essential. A vast range of speculative dogma, though often insisted upon as essential part to salvation, can hardly be a constituent part of Christianity, since the vastly greater part of the Christian world knows nothing of it.

Christ never emphasized organizations, rites, ceremonies or dogmas. His great words were love, righteousness, sonship to God and the like. He said that all ritual observances were trifling in comparison with judgment, mercy and the love of God; that he who had wronged a brother might better leave his sacrifice unoffered and go and right the wrong; that love to God and man was the substance of all laws and perfect commandments; and his life was the perfect commentary on these sayings. It was that of a chief obedient, trustful son of God. His one controlling concern was to found and foster the kingdom of God; that is, the reign of love among men. For this end he labored, suffered and died, and taught that his followers must follow him in this path of service and sacrifice. To live in the kind of life he lived is the essence of Christianity. See CHRISTIAN CHURCH.

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GEORGE BARKER STEVENS,
Late Professor of Systematic Theology, Yale University.

CHRISTIANS OF SAINT THOMAS, the name of a sect of Christians on the coast of Malabar, in southern India, to which region the apostle Saint Thomas is said (by a tradition that has little to justify it) to have carried the gospel. The facts of their history are not well made out. They originally belonged probably to a body of Christians who, in the year 499, united to form a Syrian and Chaldaic Church in eastern Asia, and who were adherents of the doctrines taught by the heretic Nestorius. At an early date (7th century) the Persian Church had adopted the name of Christians of Saint Thomas, and the Christians of Malabar received bishops from Persia. Latterly the Christians of Saint Thomas gained the position of a military caste which locally had considerable power. When the Portuguese gained a position in Malabar these Christians were forced to join the Roman Catholic Church (1599). But in 1653 many of them renounced this union, and having in 1665 received a bishop sent by the patriarch of Antioch, they have since belonged to the Jacobite body of Eastern Christians. The Church is now under seven bishops with a patriarch at the head; and the adherents number about 300,000. They give communion in both kinds, and in some other matters differ from the Roman Catholic Church. They allow the consecration of a married layman or deacon to the office of priest. Their churches contain no symbols or pictures except the cross. Their liturgy is similar to the Syrian, and the Syrian language is used in it. At present they are, under the British government, free from any ecclesiastical restraint, and form among themselves a kind of spiritual republic, in which the priests and elders administer justice, using excommunication as a means of punishment. Consult 'The Indian Empire,' by Sir W. W. Hunter.

CHRISTIANSAND, krĭs'tē-ăn-sănd, Norway, city in the southern part of the country, situated on a sandy plain at the mouth of the Torrisdals Elv, in the Bay of Christiansand. It was built by Christian IV in 1641; and has been the capital of its province or stift since 1684. It has several dockyards, a good harbor, much used for refuge, and a considerable trade in timber, pitch, stockfish (salted cod), fish-oil for curriers, salmon, mackerel and lobsters, the latter chiefly for the London market. Hides, copper and iron are also exported. Shipbuilding is a considerable industry. Christiansand has a cathedral and grammar-school, and is the residence of a bishop. The streets are wide, straight, and regular; the houses are built of wood and detached, presenting altogether a remarkable colonial appearance. It has twice, once in 1880 and once in 1892, been devastated by fires. Its fortifications have become useless because of the fortress built at Flekkerö, five miles distant. Pop. 15,154.

CHRISTIANSTED, krĭs'tĭ-ăn-stĕt, capital of the Danish West Indies, and chief town in the island of Santa Cruz, situated on the northeast shore. The harbor is difficult of access, being encumbered with many shoals, one of which stretches out nearly two miles seaward in a northeasterly direction. Pop. 6,000.

CHRISTIANSUND, Norway, seaport on the northwestern coast, capital of the bailiwick of Romsdal, 82 miles southwest of Trondhjem, on three islands, which enclose its beautiful land-locked harbor. Fresh water is scarce and must be brought to the islands in long aqueducts. The trade of the place is considerable, and the principal export is dried cod, chiefly for the Spanish and Italian markets. The town was founded in 1734 by Christian VI of Denmark, who gave it its privileges.

CHRISTIE, Anne, Canadian poet and novelist: b. London, England, 1837. She went to Canada in early life and settled on Amherst Island, near Kingston, Ontario. Later she removed to Ottawa. She wrote several short stories and poems for American, British and Canadian periodicals. She also wrote for the *Magazine of Poetry* and received high praise from distinguished critics for her verses dealing with the Riel rebellion. Her novels include 'Alice Grey' (1873); 'Edged Tools' (1880); 'Requited' (1886); 'Loved I not Honour More' (1889).

CHRISTIE, Richard Copley, English scholar: b. Lenton, Nottinghamshire, 22 July 1830; d. Ribsden, 9 Jan. 1901. He was educated at Oxford, studied law and practised his profession 1857–77. He was professor of political economy at Owens College, Manchester, 1854–66, and was chancellor of the diocese of Manchester 1872–94. After retiring from the profession he gave much time to bibliographical research, and besides contributing to the 'Dic-

tionary of National Biography' he published 'Étienne Dolet, the Martyr of the Renaissance' (1880); 'Old Church and School Libraries of Lancashire' (1885); 'Letters of Sir Thomas Copley.' He gave to Owens College the Christie Library, opened in 1898, and at his death bequeathed his library of 75,000 volumes to the same institution. Consult *The Athenæum*, 19 Jan. 1901.

CHRISTIE, Sir William Henry Mahoney, English astronomer: b. Woolwich 1845. He was educated at King's College School, London, and at Trinity College, Cambridge. He became fellow of the latter in 1869 and in the following year was made chief assistant at the Greenwich Observatory. In 1880 he was secretary of the Royal Astronomical Society and in 1881 became Astronomer Royal, remaining in this relation until 1910. He has published numerous technical papers in scientific periodicals and the volume 'Manual of Elementary Astronomy' (1875). He was created K.C.B. in 1904.

CHRISTIE JOHNSTONE, a story by Charles Reade, published in 1855. The story, by turns pathetic and humorous, abounds in vivid and dramatic scenes of Scottish life by the sea.

CHRISTINA, krĭ-tē'na, queen of Sweden: b. Stockholm, 9 Dec. 1626; d. Rome, 19 April 1689. She was a daughter of Gustavus Adolphus, and her education was conducted in a masculine manner. After the death of Gustavus in 1632 the States-General appointed guardians to the Queen Christina, then but six years old. These were the five highest officers of the Crown, who were entrusted at the same time with the administration of the kingdom. The education of Christina was continued according to the plan of Gustavus Adolphus. She learned the ancient languages, history, geography, politics, and renounced the pleasures of her age in order to devote herself entirely to study. In 1644 in her 18th year she took upon herself the government. A great talent for business, and great firmness of purpose, distinguished her first steps. She terminated the war with Denmark, and obtained several provinces by the treaty concluded at Brömsebro in 1645. She then, contrary to the advice of Oxenstiern, who hoped to gain, by the continuance of the war, still greater advantages for Sweden, labored to re-establish peace in Germany, in order to be able to devote herself uninterruptedly to the sciences and the arts of peace. France, Spain, Holland and England sought her friendship. She promoted commerce by wise legislation, and patronized the learned and literary institutions. She declined to marry her cousin, Charles Gustavus, but induced the States-General in 1649 to designate him for her successor. In 1650 she caused herself to be crowned with great pomp, and with the title of king. From that time she neglected her ancient ministers, and listened to the advice of ambitious favorites. The public treasure was squandered with extravagant profusion. Distinctions were conferred upon the undeserving, and produced jealous murmurs, complaints and factions. In this state of confusion the Queen declared her intention of abdicating the crown. The old ministers remonstrated with so much energy that the Queen desisted from her resolution. She now grasped with more firmness the reins of government, and occupied herself again with study, bought paintings, medals, manuscript, books, maintained a correspondence with many learned men and invited several to her court. Descartes, Grotius, Salmasius, Bochart, Huet, Chevreau, Naudé, Vossius, Conring, Meibom, appeared in Stockholm, and the Queen conversed familiarly with them on literary and philosophical subjects. But new troubles occurred; and Christina, who loved whatever was uncommon, resumed her determination to resign the crown.

In 1654 she assembled the States-General at Upsala, and in their presence laid aside the insignia of royalty to surrender them into the hands of Prince Charles Gustavus. She reserved to herself a certain income, entire independence and full power over her suite and household. A few days after she left Sweden, and went to Brussels, where she made a secret profession of the Roman Catholic religion, which she afterward publicly confirmed in Innsbruck. From here she went to Rome, which she entered on horseback in the costume of an Amazon, with great pomp. When the Pope Alexander VII confirmed her she adopted the surname of Alessandra. In 1656 she visited France, where her dress and manners produced an unfavorable impression, but her talents and knowledge were generally admired. She offered to mediate between France and Spain; but Mazarin declined the offer. While at Fontainebleau during this visit, abusing the right of extra-territoriality, she had Monaldeschi, her grand equerry and lover, executed before her eyes, as a faithless traitor. Mazarin succeeded in accelerating her departure from France under various pretexts. After the death of Charles Gustavus in 1660, the Queen made a visit to Sweden, under pretense of wishing to arrange her private affairs; but it was soon perceived that she had other views. As the Crown Prince was very young, she declared that in case of his death she should lay claim to the throne. This project was unfavorably received and she was compelled to sign a formal act of abdication. About this time she aspired to the Polish Crown, but the Poles took no notice of her wishes. Finally she returned to Rome, where she passed the remainder of her life in the cultivation of the arts and sciences, giving way at times to fits of sensual indulgence. She was interred in the church of Saint Peter, and the Pope erected a monument to her with a long inscription. She had asked only for these few words: *Virit Christina annos LXIII.* Consult Archenholtz, 'Vie de Christine par elle-même' (Stockholm 1751); Bain, 'Christina, Queen of Sweden' (London 1890); Geyer, 'Geschichte Schwedens,' Vol. III (Hamburg 1836).

CHRISTINA, Maria, queen of Spain, daughter of Francis I, king of the Two Sicilies, and mother of Isabella II, the dethroned queen of Spain: b. Naples, 27 April 1806; d. Havre, 22 Aug. 1878. She was married to Ferdinand VII in 1829, and took an active part in the affairs of Spain from 1830 to 1854. As queen-regent she governed arbitrarily, and in 1854 she abdicated.

CHRISTISON, Sir Robert, Scottish physician and toxicologist: b. Edinburgh, 18 July 1797; d. 23 Jan. 1882. He graduated in medicine at Edinburgh University in 1819, and subsequently studied in London and Paris. He was appointed to the chair of medical juris-

prudence in Edinburgh in 1822, shortly after his return to Scotland, and in 1832 was promoted to those of materia medica and clinical medicine, but resigned them in 1877 and 1855, respectively. He was twice president of the Royal College of Physicians, president of the Royal Society of Scotland and ordinary physician to the queen in Scotland. He was created a baronet in 1871. The most important of his published works is his 'Treatise on Poisons' (1829); he also wrote 'Granular Degeneration of the Kidneys' (1839); and a commentary on the 'Pharmacopœias of Great Britain' (1842).

CHRISTLIEB, krist'lēb, **Theodor,** German theologian: b. Bukenfeld, Würtemberg, 7 March 1833; d. Bonn, 15 Aug. 1889. He studied at Tübingen, after which he taught for some time in France. In 1858 he began preaching in London, where his famous lectures on 'Modern Doubt and Christian Belief' were later published. After a stay of seven years in London, in 1865 he returned to Germany, and subsequently, in 1868, became professor of theology at Bonn. In 1873 he was sent to the United States as a delegate to the Evangelical Christian Alliance, then convened in New York, and delivered a lecture before that body on rationalism. Prominent among his publications are 'Leben und Lehre des Johannes Scotus Erigena' (1860); 'Modern Doubt and Christian Belief' (1874); 'Protestant Foreign Missions, Their Present State' (1880), etc.

CHRISTMAS, derived from the mediæval *Christes Masse,* the Mass of Christ; the feast commemorating the birth of Jesus, observed by the Christian Church annually on the 25th of December. It was, according to many authorities, not celebrated in the first centuries of the Christian Church, as the Christian usage in general was to celebrate the death of remarkable persons rather than their birth. The death of the martyr Stephen, and the massacre of the innocents at Bethlehem, had been already long celebrated, when, perhaps in opposition to the doctrine of the Manichæans respecting the birth of the Saviour, a feast was established in memory of this event in the 4th century. In the 5th century the Western Church ordered it to be celebrated forever on the day of the old Roman feast of the birth of Sol, as no certain knowledge of the day of Christ's birth existed. Among the German and Celtic tribes the winter solstice was considered an important point of the year, and they held their chief festival of Yule to commemorate the return of the burning-wheel. The holly, the mistletoe, the Yule log and the wassail bowl are relics of pre-Christian times. In the East Christmas was celebrated on 6 January. As told in the Gospel of Saint Luke, Christ was born during the night, and therefore divine service was performed in the night of 24–25 December, from which circumstance Christmas is called in German Weihnachten, a contraction of the old German ze wih nahten, on the holy or consecrated nights. The feasts of the martyr Stephen and the evangelist Saint John were united with it, and a feast of three days' continuance was thus formed. In the ecclesiastical year this festival gives name to a period extending from the first Sunday of Advent to the feast of Epiphany, 6 January. In the Roman Catholic Church priests are allowed to celebrate three masses against the rule which prevails every other day in the year. In the Greek and Roman Catholic churches the manger, the holy family, etc., are sometimes represented at large and before them are sung the carols and manger songs which are musical features of Christmastide. Most Christian churches celebrate this great festival in some way, and practically the entire community in Christian countries, including Jews and non-churchgoing people nominally classed with Christian populations, join in its social observance. In the United States, England and other countries business is commonly suspended, although in Scotland this is only partially the case. The custom of making presents at Christmas is derived from ancient usage; but it has become consecrated by ages, and contributes greatly to make this festival an interesting event to families. (See BEFANA). The sending of Christmas cards by way of friendly greeting and remembrance has grown up since about 1860. The Christmas-tree has been traced back to the Romans. It went from Germany to Great Britain, and is almost universal in the United States, where the customs of so many nationalities meet and gradually blend into common usage.

CHRISTMAS-BOX. See BOXING-DAY.

CHRISTMAS CAROL, a song in celebration of Christ's birth, sung especially at Christmas time. Such carols, as well as many of a more secular but always joyous nature, have been long popular among the people of many nations. In France they are known as noëls, and various good collections of them have been published from time to time. Consult Sandys, 'Christmas Carols, Ancient and Modern.'

CHRISTMAS GIFTS, Origins of. See BEFANA.

CHRISTMAS ISLAND, the name given to three oceanic islands, of which the most important is situated 200 miles southwest of Java. This island, which is supposed to have been originally a coral atoll, and to have been raised by volcanic forces, rises to the height of nearly 1,600 feet and is in shape an irregular quadrilateral nine miles long and about nine miles wide. It was annexed by Great Britain in 1888, and a settlement has been formed on it for the purpose of developing beds of phosphate. The population in December 1914 was about 1,670, all employed in the phosphate industry.

CHRISTOLOGY, in the widest sense, includes whatsoever of theology bears upon the Christ; in a limited and technical sense, it is that branch of theology which treats of the nature, personality and activities of the Christ. In this technical sense, Christology may be conveniently treated according to the historical evolution of ideas Christological in: I. The Old Testament; II. The New Testament; III. The Early Church; IV. Modern Schools of Christology.

The viewpoint of this article is that alike of Catholics and of Protestants, who have the traditional belief in the divinity of Christ. The names Catholic and Protestant have of set purpose been omitted, since the matter of belief is common. The essentials of the Christology of the Reformers have not been given; they are

the traditional and conservative ideas that run through the article. Anything distinctive of each form of Christian belief is left to the articles on the various religious denominations.

I. Christology of the Old Testament.— They who accept the Bible as the Word of God, and consequently derive religion from God's revelations to the human race, trace the idea of a Christ throughout many prophecies contained in the Old Testament.

Early Prophecies.— Immediately after the fall of the human race in Adam, God promised a victory of that race over the enemy that caused its fall (Gen. iii, 14–15). In the divine promises made to Abraham, Isaac and Jacob, this victory was spoken of as salvation by their seed (Gen. xiii, 16; xv, 5; xviii, 17–19; xxii, 17–18; xxvi, 4; xxviii, 14). The saving seed of Jacob was designated as a Ruler in the patriarch's blessing of Judah:

> "The sceptre shall not pass from Judah,
> Nor the ruler's staff from between his feet,
> Till that *he* come whose it is,
> And *his* be the obedience of the folk." (Gen. xlix, 10)

From Mosaic days, Israel looked forward to a salvation that should come through a King of the line of Jacob and of Judah (Num. xxiv, 17–19). To David (B.C. 1017–977), it was revealed through Nathan that out of the line of Judah the Davidic family was chosen as the source of the royal Saviour of Israel (2 Sam. vii, 1–16; 1 Chron. xvii, 11–14). Such is the interpretation of this revelation that is given in Hebrews i, 5.

The Christ of the Psalter.— In its present inspired content, the Psalter is the result of a gradual evolution. The Psalters of David, the Director, Asaph, etc., were finally collated and arranged in a lyric anthology that records Israel's religious thought from the time of David to that of Esdras. Three lyrics will sufficiently indicate the Christological ideas, whereof these inspired psalms afford abundant evidence. In Psalm 2, probably written in the time of David, is the first mention of the Christ, "the Anointed," the Messiah (verse 2), whom previous Old Testament writings speak of as the saving King. Acts iv, 25–28 interprets the first two verses of this psalm as foreboding the united efforts of Jew and Gentile to overthrow the Christ. The Christ of the Psalmist is the Son of God, begotten in eternity: "Jahweh said to me: My Son art thou: I to-day begat thee" (verse 7). The divine name Jahweh, wrongly written Jehovah, means "He is"; and denotes the ever being of the Deity. Hebrews, in proving the divinity of Jesus, interprets this verse of natural divine sonship of the Christ (Heb. i, 5). In like manner, the Jews of the time of Jesus looked forward to the Christ, the King of Israel, as the Son of God. Witness the act of faith of Nathaniel: "Rabbi, thou art the Son of God; thou art the King of Israel" (John i, 49). Witness the authoritative and judicial query of Caiaphas: "I adjure thee by the living God to tell us if thou be the Christ, the Son of God" (Matt. xxvi, 63). This expectation of the Jews infiltrated even into Samaritan religious life. The Samaritan woman said to Jesus: "I know that the Messiah who is called the Christ, is coming" (John iv, 25).

In Psalm 45 (44) :7–8, we find "Thy throne, O God, is forever and ever. . . . Thy God, O God, hath anointed thee." Hebrews i. 8–9 refers these words to the Christ as the natural Son of God, the first born of the Father and the object of adoration to the angels (Heb. i, 6). Hence, the Christ is here twice called God; and his throne, or reign, is said to be from eternity.

In Psalm 109 (110); 1. "Jahweh said to Adonai: Sit thou at my right hand." This passage is cited by the Christ to prove that he is Adonai, seated at the right hand of Jahweh (Matt. xxii, 44). But Adonai, "my Master," as a proper name, is used exclusively of the Deity, either alone or in such a phrase as Jahweh Adonai; indeed, in the stead of the ineffable name, Jahweh, the pious Jew read Adonai. It is clear, then, that in this lyric, Jahweh addresses the Christ as a different Person and yet identical in Godhead. Moreover, farther on Jahweh says to the Christ: "Before the day-star I begat thee" (verse 3). Hence the Christ of this psalm is the begotten of God, sharing the nature of his Father, different in personality; he is before the world comes into being; he sits at the right hand of the Father from all eternity.

The Sophio-Logos of the Sapiential Books. — In Proverbs, Wisdom, and Ecclesiasticus, the Christ appears as the uncreated Sophia and Logos, the personified divine Wisdom and Word, a divine Person distinct from the first Person.

The Christ of the Early Prophets.— Isaiah who prophesied before the fall of Samaria (B.C. 722), will serve as a witness to the Christological ideas of the Prophets of the Assyrian period. All his invective and foreboding in regard to the degeneracy and downfall of Israel are tempered by a Messianic hope that ever and anon looms large over against a stormy horizon. What though Samaria be on the point of falling? Fear not the Assyrian hordes.

> "Say to the fluttering of heart:
> Be brave! Fear not!
> Lo, with vengeance your God will come in quittance:
> Your God, he will come and save you!" (Is. xxxv. 4)

Manifold and multiform is the clear prophecy of Isaiah that the nature of the Christ will be divine. "Make ready the way of Jahweh" (xl, 3). "Lo, Adonai Jahweh will come with might" (xl, 10). Saint Mark, witnessing to the Messianic expectation of his time, identifies Jahweh of this prophecy with the Christ (Mark i, 3). Not only Jahweh, but a new divine name is given by Isaiah to the Messiah: "His name will be called Immanuel" (Is. vii, 14). This prophecy is said by Saint Matthew to be fulfilled in the divinity of Jesus the Christ: "They shall call his name Emmanuel, which, being interpreted, is God with us" (Matt. i, 23). Equally clear is the prophecy of the divinity of the Christ, when Isaiah says: "A child is born to us . . . his name shall be called Wonderful, Counsellor, God the Strong One, the Father of the world to come, the Prince of Peace" (Is. ix, 6). The very same child, whose coming is to be the salvation of Israel, is called Immanuel (vii, 14) and God the Strong One (ix, 6). The former name explains the latter. The Christ will be with Israel more intimately than Jahweh Shechinah, "Jahweh, He who tents with us." By this more intimate presence and

greater efficiency of Immanuel, is the Christ to be God the Strong One.

Though more efficacious than Jahweh of the old Law, by his exercise of might in Israel, the Christ will be "the Sprout of Jahweh" (Is. iv, 2), the same in nature as the Father. "The Saviour sent by our God" (Is. lii, 10) will be "God our King" (Is. lii, 7),—yea, very God of very God, "Jahweh the God of Israel" (Is. lii, 12), "He that hath made thee, Jahweh of the hosts his name" (Is. liv, 5).

The Christ of the later Prophets.—Among the prophets of the Babylonian period, Jeremiah stands out as a beacon of Messianic hope. While thundering against sin, before B.C. 586, he foretells the peace that is to be through the Christ, "Jahweh our Just One" (xxiii, 6; xxxiii, 16). Malachi (B.C. 459–445) says: "Behold I send *my angel*, and he shall prepare the way before *my* face, and presently the Lord, whom ye seek, and the angel of the testament, whom ye desire, shall come to his temple" (iii, 1). The Christ himself interprets "*my* angel" as his precursor, John the Baptist, who prepared the way before his public life (Matt. xi, 10). The Christ was, therefore, the spokesman of the words of Malachi. But the words of Malachi are uttered by Jahweh the great God of Israel. Hence, in this prophecy of Malachi, as elsewhere in the prophets, the type merges into the antitype, the God of the Old Testament becomes the God of the New, Jahweh and the Christ are one and the same divine person.

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II. Christology of the New Testament.— Three fundamental facts are taught by the Christology of the New Testament: (1) The Divine Nature of Jesus Christ; (2) The Human Nature of Jesus Christ; (3) The Hypostatic Union of the Human with the Divine Nature in the Divine Person of Jesus Christ.

The Divine Nature of Jesus Christ.— By the Christology of the Gospels and of Saint Paul, the divinity of Christ stands out in clear relief. The underlying, and at times overlapping, purpose of Matthew, Mark, Luke, John and Paul, is to establish the divine nature of Jesus. For the sake of brevity, the evidence will be limited to two forms of this doctrine. First Jesus is the natural Son of God; secondly, he is very God. These two forms of the doctrine of the divinity of the Christ are deduced from documents, which are assumed to be authentic, historical and inspired. The origin of Mark from "Q" and another early document, the dependence of Luke upon Mark and the Logia, the sources of Matthew, the authenticity of the Pauline epistles,—all these questions are waived in this statement of conservative Christology of the New Testament.

A. First, Jesus Christ is the Son of God. At Cæsarea Philippi, during the third year of his ministry, Jesus asked the disciples: "Who do men say that the Son of Man is?" (Matt. xvi, 13). This name, Son of Man, was one of predilection to Jesus; it connoted his oneness with men. The disciples made answer that *others* said he was one of the prophets. Christ pressed them: "But who do *ye* say that I am?" (ibid. 16). Peter, as spokesman, replied: "Thou art the Christ, the son of the living God" (ibid. 16). Peter meant more than they who said that Jesus was one of the prophets. They meant that he was the *adopted* son of God. All the prophets were the *adopted* sons of God both by grace and by descent from Abraham. Without special divine revelation, Peter might have known that Jesus was such an *adopted* son of God. The divine sonship that he assigned to Jesus was known to him by special revelation, and not by acquired knowledge. Peter meant that Jesus was the *natural* Son of God. The Christ approved of both the avowal and the source of information: "Blessed art thou, Simon son of John; for flesh and blood hath not revealed this to thee, but my Father who is in heaven" (ibid. 17). Jesus here admits that he is the *natural* Son of God; that God is his Father by a title greater than that whereby the prophets and other saintly leaders in Israel were *adopted* sons of God. That title is identity of divine nature. Friend and foe alike were allowed by Jesus to address him as the Son of God, and to show by *adoration* that they meant real and *natural* sonship, not a figurative and adoptive divine sonship consequent upon personal and racial sanctity. Men possessed by unclean spirits *prostrated themselves* in adoration before him, and the spirits of evil were forced to cry out: "Thou art the Son of God" (Mark iii, 12). His disciples, after the stilling of the storm at sea, *adored* him and said: "Indeed thou art the Son of God" (Matt. xiv, 33). The man born blind, whom Christ had cured at Jerusalem, was asked to make an act of faith in the divinity of the Wonderworker: "Dost thou believe in the Son of God?" And after a brief instruction, "he said: 'I believe, Lord'; and he *adored* him" (John ix, 36–37). The centurion on Calvary (Matt. xxvii, 54; Mark xv, 39), the evangelist Saint Mark (i, 1), the hypothetical witness of Satan (Matt. iv, 3) and of the enemies of Christ (Matt. xxvii, 40), all go to show that Jesus was called and esteemed the true Son of God. Never once did Jesus suggest that men should not give him the adoration due to God alone; never did he hint that men erred in making him more than the adopted son of God.

He could not have suggested such error. Adoration was his due. He claimed to be that which adoration implied,— the real and natural Son of God. It was just before the end. Jesus had journeyed to Judea for the last time. He would continue his ministry thereabout for three months until the last Passover. Open and

frank then were the teachings that had at times been given under the esoteric form of the parable. One day, during the celebration of the Feast of the Dedication of the Temple, Jesus was walking neath the portico of Solomon on the temple plot. His foes were on the watch. They wished to catch him in speech. So they gathered round about and said: "How long dost thou hold our souls in suspense? If thou be the Christ, tell us plainly." The answer of the Christ was typical. He put them off for a while; chided them for unbelief, for the rejection of the abundant testimony that his works bore of the truth of the Messianic claim. And then followed the clear and tremendous teaching: "I and the Father are one." The Jews understood at once. They took up stones to kill him. He asked why. He made them admit that they understood him aright. They replied: "We stone thee not for a good work, but for blasphemy; yea, for that thou, being a man, makest thyself God." Had they misunderstood, Jesus would have cleared himself of the charge; would have at once denied all claim to true divine sonship, to identity of nature with God the Father. He made no such denial. He pressed the claim more fully home: "Do ye say of him whom the Father hath sanctified and sent into the world, 'Thou blasphemest,' because I said, I am the Son of God? . . . The Father is in Me and I am in the Father" (John x, 22–38). A last incident worth special note is the judicial procedure before Caiaphas, who was *de jure* High Priest of the time. Jesus had hitherto held his peace, and made no reply to any false charges. But when Caiaphas solemnly queried in regard to the very fundamental issue of the Messianic mission, silence was broken. Caiaphas demanded: "I adjure thee by the living God, that thou tell us if thou be the Christ, the Son of God" (Matt. xxvi, 63). Simple and to the point is the answer: "I am" (Mark xiv, 62). Caiaphas understood. He rent his garments and accused Jesus of blasphemy. All joined in condemning him to death for the supposed blasphemy of claiming to be the *natural* Son of God. Jesus allowed them to understand his claim, and to put him to death therefor. Had he not made claim to be the *natural* Son of God, he would have been obliged in all truth and fairness to correct the wrong impression.

B. Secondly, Jesus Christ is very God. Again and again New Testament Christology bears witness to this second form of the doctrine of the divine nature of the Christ,—namely, to the fact that Jesus Christ is very God.

In the tradition of John, Jesus identifies himself absolutely with God: "He that seeth me, seeth the Father" (John xiv, 9). The very purpose of the Gospel of John is "that ye may believe that Jesus is the Christ, the Son of God" (John xx, 31). The opening of the prologue is a grand summary of the fundamental facts of Christology: "In the beginning was the Logos, and the Logos was in relation to God the Father, and the Logos was God" (John i, 1).

From all eternity was the Logos, the Word. And the Logos of John is Jesus the Christ. For the Logos is he of whom the Baptist bears witness: "This is he of whom I said,—He who is come after me, is before me" (John i, 15). But he of whom the Baptist bears this witness is Jesus the Christ (John i, 30). Therefore the Logos is Jesus the Christ. Hence the Christ was from all eternity.

Moreover, "the Logos was in relation to God the Father." This translation is correct. The words ὁ θεός (with the article) mean, in Johannine Hellenistic, "God the Father." The preposition πρός is the Platonic, as well as Aristotelian, way of expressing relation. Neo-Platonic ideas and forms had got a vogue in Alexandria. Alexandrian philosophy had been brought over the sea to Ephesus. It was the influence of this Alexandrian philosophy in Ephesus and elsewhere that John set himself to combat. Quite naturally, then, he adopted some of the expressions of the hostile school, and adapted them to his Christology. To stem the inrushing tide of Gnosticism, he clearly set it down that Jesus the Christ, the Logos of his Gospel, was from eternity, was in nature God, was in relation to God the Father from all eternity, and therefore a distinct divine Person. And to drive home by irresistible clearness of statement, the teaching of the divine nature of Jesus, John immediately added: "All things by him came into being, and apart from him came into being not one thing that is" (John i, 3). Jesus is the very God, who "in the beginning created heavens and earth" (Genesis i, 1).

Similarly in his Epistles, John gives certain witness to the very Godhead of Jesus: "We know that the Son of God is come. And he hath given us understanding that we may know the true God, and may be in his Son. *This* is the true God and life eternal" (1 John v, 20). The Patristic interpretation down the centuries refers *this* to the Christ: "Jesus is the true God, and life eternal."

Saint Paul is as absolute in his witness of the Deity of Jesus as are the evangelists. To the great Apostle, Jesus is the Christ, "who is over all things, God blessed for ever" (Romans ix, 5). The Christ is Jahweh of the Exodus: "And all drank the same spiritual drink; yea, they drank of the spiritual Rock that followed them, and the Rock was the Christ" (1 Corinthians x, 4). It was Jesus whom some of the Israelites tempted; and they perished by serpents (ibid. x, 19). It was he, against whom "some of them murmured; and they were destroyed by the destroyer" (ibid. x, 10). "In him dwelleth the fulness of the Godhead corporeally" (Colossians ii, 9). Men should not go so low as to give to angels, that they see not, the adoration due only to the Christ (ibid. ii, 18). "For in him all things were created . . . all things were created by him and for him" (ibid. i, 16). "Although he was in the nature of God, yet did he not look upon equality with God as above all things to be clung to; but he emptied himself by taking the nature of a slave and by becoming like men. And having appeared among us in outward bearing as mere man, he still further humbled himself by submitting even to death,—even to death on a cross. And that is why God the Father raised him to the very highest place, and freely gave him THE NAME which stands above all other names; so that in THE NAME of Jesus (at the Jahwistic power of Jesus) every knee should bend in heavens, on earth and under the earth, and every tongue should confess that Jesus Christ is Jahweh in the glory of God the Father" (Philippians ii, 6–11).

The Human Nature of Jesus Christ.—The

Gospel story of the birth, upbringing, public life, private life, suffering and death of Jesus would all be a lie, were he not a Man with human nature such as ours. "For there is one God, and one Mediator between God and men, the Man Christ Jesus" (1 Timothy ii, 5). He is the "seed of Abraham" (Galatians iii, 16), the son of David (Matt. i, 1), the fruit of the loins of David (Acts ii, 30), made of the seed of David according to the flesh (Romans i, 3). To prove the human nature of the post-Resurrection Christ, Jesus even takes pains to enumerate the parts of his body: "See my hands and feet, that it is I myself; handle and see; for a spirit hath not flesh and bones as ye see me to have" (Luke xxiv, 39).

The Hypostatic Union of the Divine Nature with the Human in the Divine Person Jesus Christ.— New Testament Christology teaches not only that the Christ is true God and true Man,— i.e., has divine and human nature,— but that the two natures are physically united in one hypostasis or person, and that Person is divine. The very same Person, the Logos, the Christ, was God in the beginning (John i, 1), was in Personal relation with God the Father from eternity (ibid. i, 2), created all things (ibid. i, 3), and was made flesh,— i.e., became Man in time (ibid. i, 14). The same divine Person, the Christ, "although he was in the nature of God, yet . . . emptied himself by taking the nature of a slave and becoming like men. And having appeared among us in outward bearing as mere man" (Philippians ii, 6-7), he was "in every way tempted, exactly as we have been, yet without sinning" (Hebrews iv, 15). During the beginnings of the Church in Jerusalem, Saint Peter told the people, at the Gate of Solomon: "The Author of life ye have put to death, but God raised him from the dead" (Acts iii, 15). It is always one and the same Person, Jesus Christ, who is said to be God and Man, or is given predicates that denote divine and human nature.

Bibliography.— The literature of New Testament Christology is enormous. A few of the works most worthy of note are: *Fathers of the Church:* Saint Irenæus, 'Adversus Hæreses'; Saint Athanasius, 'De Incarnatione Verbi'; id., 'Contra Arianos'; Saint Ambrose, 'De Incarnatione'; Saint Gregory of Nyssa, 'Antirrheticus contra Apollinarium'; id., 'Tractatus ad Theophilum'; Saint Gregory of Nazianzen, Saint Cyril of Alexandria, who wrote explicitly against the Arians, Nestorians, Monophysites and Monothelites. *Scholastics:* Saint Thomas, 'Summa' (III. qq. 1-59); Saint Bonaventure, 'Brevil.' (IV); id., 'In iii Sent.'; Bellarmine, 'De Christo Capite totius Ecclesiæ Controversiæ'; Suarez, De Lugo, Petau, Franzelin, Hurter, Stentrup, Billot, Pesch, Billuart, in the treatise 'De Verbo.' *Lives of Christ;* Saint Bonaventure, Ludolph of Saxony, Veuillot, Coleridge, Grimm, Farrar, Fouard, Didon, Maas, Plumptre, Geikie, Edersheim. *Dogmatic Works:* Liddon, 'Divinity of our Lord and Saviour Jesus Christ' (1866); Roh, 'Who and What is Christ?' (1890); Gore, 'Incarnation of the Son of God' (1891); Mathews, 'Messianic Hope in the New Testament' (1905); Prat, 'Théologie de St. Paul' (1909); Briggs, 'Messiah of the Gospels' (1894); 'Messiah of the Apostles' (1895); 'New Light on the Life of Jesus' (1909); 'Incarnation of the Lord' (1902); Drum, 'Divinity of Christ' (1918).

III. Christology of the Early Church.— Of little import are the early heresies of Basilides, Marcion, Valentinus, the Manichæans and Apollinaris. They were combated by the Fathers of the time. First to attack effectively the conservative Christology of the early Church was Arius. He set the heresy agog that the Christ was not of one essence, nature or substance with God,— not a divine Person,— was at most a half-way between the human and the divine. This heresy was condemned by the declaration of the Church in the Council of Nicæa, A.D. 325, which defined the divinity of the single Person, Jesus Christ, and his twofold nature,— human and divine. Later Nestorius started a new form of heresy. He taught that, in Jesus, there were the human nature, and therefore a human person; and also a divine Person with a divine nature. This heresy was condemned by the Church, which in the Council of Ephesus, A.D. 431, defined the oneness and divinity of the single Person, the Christ; and the physical unity in this divine Person, of the double nature, human and divine, of the Word made Flesh. Later another heresy took rise. By the anathema of Nicæa, the Church had made it impossible to teach, in the sense of Arius, that, in Jesus, there is no divine Person and no divine nature. In the Council of Ephesus the Church had condemned the opinion of Nestorius that, in Jesus, there were two persons and two natures. Was there room for more heresy? Yes, Eutyches saw a loophole. He taught that, in Jesus, there was only one Person, the divine, and only one nature. The followers of Eutyches, Monophysites, taught either an intermingling of the two natures of Christ into one; or some sort of a conversion of the human nature into the divine. The Council of Chalcedon, A.D. 451, launched an anathema against all Monophysites; and defined still more clearly that, in Jesus, there were two distinct natures, the divine and the human, physically united in one divine Person, and yet not merged into one nature.

What more? Since the two natures of Jesus were physically united in one divine Person, what handle for heresy remained? One handle more! Three of the Oriental patriarchs,— Sergius of Constantinople, Cyrus of Alexandria and Athanasius of Antioch,— joined their patriarchal power in one last effort to destroy the great mystery of the Christian faith. They had to admit with Nicæa, Ephesus and Chalcedon that one divine Person, Jesus the Christ, had two natures, the divine and the human, physically united in one hypostasis or Person. But they resented the mystery of a perfect Man, who was not a human person. They withdrew from the perfection of the human nature of Jesus. They taught that, in Jesus, there was no human activity; that the activity of the human nature was merged into the activity of the divine; that, in Jesus, there was only the activity of the divine nature; that, in Jesus, there was only one activity, and one will, and that one activity and one will were divine. Against this heresy, the Council of Constantinople, A.D. 680, defined the perfection of the human nature of the Christ, his perfect human will distinct from the divine, his perfect human activity distinct from the divine.

One more effort was made by the Orient to detract from the perfection of the two natures in Christ. Photius, in the 9th century, admitted with the Council of Constantinople, the perfection of the human nature of Jesus; he detracted from the divine, and denied to the Son equality with the Father in the procession of the Holy Spirit. He was condemned. The Church taught the equality of Father and Son, the procession of the Holy Spirit from Father and Son as from one principle. A schism resulted. The tear was mended for a century and a half. Then, in the middle of the 11th century, under the Emperor Michael Cærularius, the party of Photius again gained power. Constantinople was wrenched from Rome. The Eastern Church was separated from the Western in its Christology.

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IV. Modern Schools of Christology.— *Unitarians.*—After the break between the Eastern and Western churches, there were no widespread, epoch-making Christological controversies for many centuries. The Reformers took over the three fundamental facts of traditional Christology; they taught the divinity and the humanity of the one divine Person, Jesus Christ. An exception was Lælius Socinus, who in A.D. 1544 was obliged to leave Italy for denying the divinity of Christ. From Socinianism came Unitarianism, which was first organized in Poland about A.D. 1563. Unitarians teach that Jesus is the highest of men; but profess a deism which excludes the doctrines of the Trinity and the divinity of Christ.

Modern theories of Christology are the outcome of two tendencies, which to-day divide German liberal Christologists. The first tendency is of the Religionspsychologischerklärungschule,— the school that claims to interpret religion according to the findings of psychology; its chief resultant theories are the *Ideal Christ,* and the *Christ of Experience.* The second tendency is of the Religionsgeschichtlicherklärungschule,— the school that claims to interpret religion in terms of history; its chief resultant theories are the *Christ of History* and the *Mythic Christ.* Modern Christological theories at times show both tendencies,— for instance, the *Christ of History* now and then dovetails into the *Christ of Experience;* but it will make for clear exposition, if, according to his dominant tendency, the modern Christologist be classed under one of these four main headings. All of these modern theories either explicitly deny the divinity of Christ or defend a Godhead that departs from the definitions of the early councils of the Church.

The Ideal Christ.— During the 17th century, the Lutheran theologians strove by scholasticism to defend Lutheran Christology, and to explain the union of the two natures of Christ in one divine Person. Their attempts were an intellectualistic departure from Luther's voluntaristic theology.

The revolt against this array of scholasticism on the side of Luther took place in the 18th century. The pioneer rebel was Kant (1724–1804). He was an anti-intellectualist. According to him, pure reason can reach, not the *noumenon,* the thing in itself, but the *phainomenon,* the thing in the content of consciousness; and hence pure reason cannot attain to the knowledge either of the human or the divine nature in Jesus. Hence faith is not an act of pure reason on the authority of God revealing. Faith is an act of the practical reason. Practical reason postulates, by a Kantian *Ought,* the acceptance of the Man-God; and this acceptance by the will is the Kantian act of faith in Christ (Consult Kant, 'Religion innerhalb der Grenzen der blossen Vernunft,' Chapter 4). Kant had set at naught *things in themselves.* They are, but we cannot get at them. Fichte (1762–1814) put aside even the Kantian things in themselves. What is the use of them, since we cannot get at them? The only thing we know about them is that we know nothing about them. It is the I, the Self, that makes the world. The world is whatsoever self-consciousness makes it; and self-consciousness is the Moral Will, the will to act nobly, dutifully, steadfastly, divinely. The human nature of Jesus, being part of the world, in Fichte's Christology, is a limitation of the Absolute, the projection of Moral Will, the I, the Self, into time and space. The incarnation is the union of God and man by self-consciousness. The Deity of Christ is impersonal.

The Romantic School.— Fichte's explanation of the world of subject and object as the objectifying of Moral Will led to the Romantic School. This school was started by a group of young men, all born between 1765 and 1775, the two Schlegels, Tieck, Novalis, the philosopher Schelling, and the theologian Schopenhauer. The Romanticists substituted Emotion for the Moral Will of Fichte, as their impersonal Deity. The world of objects is what emotion makes it. Dream out your world; it is a dream of the inner life,— a projection of Emotion into time and space. In Christ, the Absolute first becomes truly objective; his Godhead is not that of a Person. Josiah Royce, late Alford professor of natural religion, moral philosophy and civil polity, at Harvard, always retained the voluntarism of Schopenhauer.

Hugo Münsterberg late professor of Psychology in Harvard, was likewise voluntaristic in his philosophy. In seeking a substitute for Kant's *noumenon* — the useless *thing-in-itself*— he set down, as the ultimate category of objectivity, not *Sein,* not the *being* of the thing-in-itself; nor *Müssen,* not the *must-be* of a thing —a universal necessity consequent upon scientific consciousness; nor *Sollen,* of the Freiburg school of critical transcendentalists, not the *ought-to-be* — a necessity consequent upon Moral Will; but *Wollen,* an over-individual Will, reminiscent of the *Welt Wille* of Schopenhauer. Nietzsche's Absolute, Will Power, is also of the Romantic school. He deems Pontius Pilate to have been the nearest approach to Superman in the Gospel story.

Hegel (1770–1831), in his Absolute Idealism, is a monist. He identifies subject and object in a unity of all things; and consequently his Deity is not a Person, his Christ is an Idea. To explain the world, that seems to be outside the thinking subject, Schelling starts from the Absolute; Hegel starts from the Idea. The Absolute is the pure Idea in itself; Nature is the Idea manifested: Spirit is the Idea turning back on Itself — the Idea as Soul, Society, God. The Christ is the supreme manifestation of the Idea. Among recent Neo-Hegelians are Bradley, the Cairds, Bishop D'Arcy of Down and Canon Inge.

The Christ of Experience.— While the subjectivism of Kant led up to the various forms of the impersonal *Ideal Christ,* which the foregoing pantheists substituted for a real, personal Christ, a rival school of Christology founded its views on the existing fact of the Christ and the Christian consciousness thereof. Schleiermacher (1768–1834) started by denying that religion is a philosophy or any science at all: it is not knowing, but feeling. Every new religion is determined by a new feeling or intuition of the world outside the self. Christ had such a new intuition. His divinity lies in a consciousness of mediatorship and Godhead. He had not eternal existence, did not rise from the dead; he is divine in the complete satisfaction he gives to the Christian conscience. Rothe (1799–1867) followed Schleiermacher in denying the identity of Christ with God the Father, and affirming a divinity that is founded on the consciousness that Jesus had of his mission, and upon the Christian consciousness of the worth of the Christ. Ritschl (1822–89) followed in the wake of Schleiermacher and Rothe; and steered by the beacon of Kant. At first a disciple of Bauer, in the search and research for a *Christ of History,* he in time wearied of the unconscionable arbitrariness with which his master carved out parts of the New Testament and recast the Gospels. So Ritschl harked back to the Kantian *Ought.* Since pure reason is incapable of attaining to the *thing-in-itself,* the Christ *in himself* does not matter. What matters the categoric imperative of practical reason in the realm of Christology? Religious knowledge finds expression in independent and direct value-judgments — in judgments, for instance, about the Christ, that are independent of scientific knowledge, and the direct dictate of practical reason. By the Kantian *Ought,* we are conscious that immortal joy is assured to us, and that the Christ is of value in bringing us to that end. No motives intervene to lead pure reason. The appropriation of the Christ-values is a direct and independent act of faith, or *trust,* of the *will.* Ritschlians are numerous among Christological writers of to-day; such are Weinel, Widgery, Fairbairn, Roberts, Burton, Mathews, Macmillan, Armitage.

Somewhat akin to the Christology of Ritschl is that of the Pragmatists. James, Dewey, Schiller and others unite in making satisfactoriness their variable criterion of truth and goodness. James proposes a Deity that is impersonal, and an immortality of the soul • that is not personal. That is good, in matters religious, which works; and, in so far forth as it is satisfactory, it is true. Logically the variable Christology of pragmatism is whatsoever works, gives satisfaction, in one's attitude toward the Christ.

The Christ of History.— While the Christ of psychology has appeared in many a *Jesus-form,* the school of historical criticism in Christology has been at work. This school starts with the elimination of all elements of supernaturalism — miracles, prophecies, etc. The Virgin Birth and physical resurrection of Jesus are assumed to be impossible and unhistorical. A *Christ of History* is sought, who is not God, and yet satisfies, to explain the fact of Christianity. Strauss (1808–74) was the first to break up the Gospels into historical and mythical elements. The birth of the Baptist and of Jesus; the baptism, temptation and miracles of the Christ; the Last Supper and Resurrection — all these facts are relegated to the realm of mythology. They are myths invented to give a supernatural air to Christianity. Bauer (1792–1860) taught that Christianity was built upon faith in the Christ rather than upon the Person of Christ. Saint Paul, not Jesus, was the real founder of the Church. At first there were two parties, the Pauline and the Petrine. The Petrine party believed that Jesus was the Messiah, but clung to Judaism; from this party came the elements of the New Testament that give us a *Christ of History.* The Pauline party divorced Judaism, aimed at a universal faith, superadded the supernatural elements, was victorious over its Petrine rivals and founded Christianity with all the supernaturalism contained in Romans, 1 and 2 Corinthians and Galatians. Renan (1823–92) was free from the dogmatic violence of Strauss against supernatural religion, made no attempt to explain Christianity as the work of Paul, and presented to his readers a simple, loving, lovable, God-fearing, deluded saint and fanatic, as the *Christ of History.* Drawing upon the ideas of Daniel and other Messianic writers of the Old Testament, Jesus became fascinated and inspired with the delusion that he was the Messiah. On this account he practised pious frauds to sate the desire folk had of the miraculous; and was so misled by fanaticism as even to desire death. Among recent writers, Dr. Adolf Harnack, of Berlin University, while taking great pains to prove the genuineness of the Apostolic writings, deems them to be records of the evolution of the Christian conscience from the death of Christ to the close of the New Testament canon. His *Christ of History* is so stripped, not only of supernatural power, but even of natural ability, as not to measure up to the stature of Socrates and Aristotle. Wellhausen, of Göttingen, strips the *Christ of History* of even the noble sentiment which inculcates forgiveness of injuries. This fundamental element of Christianity, together with the parables wherein it is taught, are all said to belong to a time later than that of the Wellhausen *Christ of History.* Schmiedel, of Zürich, sifts the Gospel narrative down to nine passages, the famous pillar-passages, upon which he builds up his *Christ of History.* The historical worth of these nine passages is admitted as a start, because Schmiedel thinks that they rather degrade than exalt Jesus.

The Eschatological Christ.— The eschatological sayings of Jesus — i.e., the prophecies that have to do with the end of the world —

have led some to look upon the *Christ of History* as a fanatic, a dupe to his expectation that, before his death, the world would end in a cataclysmic upheaval and the establishment of the Messianic kingdom. He died a failure. The expectation was not fulfilled. His followers were up against the alternative of admitting that failure or of making him out to have been God. Either duped or duping, they preferred the latter alternative. Thus began the evolution of the Christian conscience which gave us Christianity in its present form. Such is the Christology of Johann Weiss, Schweitzer, Loisy, Tyrrell, Burkitt and Lake.

The Mythic Christ.— The radical and destructive reconstruction of the life of Jesus — inaugurated by Strauss, and maintained by Bossuet, Neumann and the above-mentioned critics — has left so little of fact to the *critical Christ of History,* that it is not surprising to find radicals throwing over the very existence of an historical Jesus. Jensen, of Marburg, sees in the Gospels a mere carrying on of Babylonian mythology. Other members of the Pan-Babylonian school, who class the Christ as a Babylonian Jesus-myth, are Jeremias, Drews, Gunkel and Kalthof. W. B. Smith, of Tulane University, New Orleans, holds that the Jesus-cult took its rise from a Judæo-pagan source that is indicated by the two titles *Jesus Christ.* "Neither of these titles originally meant an earthly man: both certainly designated a deity. The latter seems to be chiefly Jewish; whereas the former is at least half foreign." Cf. *Der vorchristliche Jesus.* (1911) p. xv.

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WALTER DRUM, S.J.,
Professor of Scripture, Woodstock College, Maryland.

CHRISTOPHE, krēs-tōf, **Henri,** king of Haiti: b. Grenada, West Indies, 1767; d. 8 Oct. 1820. He was an African slave who received his freedom as a reward of faithful service. On the outbreak of the negro insurrection in San Domingo, 1801, he became one of its leaders, and attracted by his energy and ability the attention of Toussaint l'Ouverture, who conferred upon him a divisional military command. After the deposition of Toussaint Christophe served under his successor, Dessalines, and waged a war of increasing ferocity against the French, who in 1803 were compelled to evacuate the island. In 1811 Christophe obtained undisputed possession of a portion of the island, and was proclaimed Henri I, king of Haiti. His reign was despotic and sanguinary.

CHRISTOPHER, Saint, a saint whose name and feast are celebrated, but whose history is little known. He is reported to have been a native of Syria or Cilicia, who was baptized by Saint Babylas, bishop of Antioch, and received the crown of martyrdom in Asia Minor about the middle of the 3d century. Relics of him are found in several places, principally in Spain. The Eastern Church celebrates his festival on 9 May; the Western on 25 July. His intercession was particularly sought in the time of the plague. Christopher literally means "bearer of Christ." He is represented as a giant, bearing the child Jesus upon his shoulders over a stream, which refers to a legend of this saint.

CHRISTOPHER NORTH, pseudonym of John Wilson, the Scotch author (q.v.).

CHRISTOPHER'S, Saint (commonly called Saint Kitt's), West Indies, an island of the Lesser Antilles or Leeward Islands, 100 miles northwest of Guadeloupe, discovered by Columbus in 1493; 23 miles in length, averaging about 5 miles in breadth and having an area of 65 square miles. It produces sugar, potatoes, tomatoes, yams, onions and other vegetables, as well as pineapples, bananas, custard-apples, cocoanuts and various other fruits. Mount Misery, the highest elevation, rises 4,100 feet. The flora and fauna are similar to those of the West Indies generally, among the latter being a species of small monkey. The climate is considered to be very healthful. This island is divided into nine parishes, Basseterre being the capital, with a population of 8,160. It was colonized by the English in 1623. Pop. of the island 26,283.

CHRISTOPULOS ATHANASIOS, Greek lyric poet: b. Kastoria, Macedonia, 1772; d. Wallachia, 29 Jan. 1847. He studied medicine and the sciences at Budapest, and finally settled at Hermannstadt in Transylvania. An epicurean in every sense of the word, and unconcerned for the fate of his country, he lived only for the gratification of his appetites and celebrated sensual indulgences in his 'Erotika and Bacchika,' or 'Love and Drinking Songs,' which have been several times collected and printed under the title of 'Lyrika.' Though partly modeled upon Anacreon and the songs of Piron, Desaugiers and other French authors, they display so much ease and simplicity, tenderness and grace, as to give their author a high place among the poets of his nation and entitle him to the name of the modern Anacreon.

CHRIST'S HOSPITAL (generally called the Blue-coat School, from the costume of the pupils), a school in London, founded by Edward VI, for supporting poor orphans. There used to be from 1,000 to 1,200 boys and girls at this establishment receiving instruction, board and clothing, the girls being comparatively few in number. The ages varied from 8 or 10 to 15 or 16, five of the best scholars being sent each year to Oxford and Cambridge. An entirely new scheme of management came into operation in 1891, according to which the preparatory school (established in 1683 at Hertford) has 120 pupils, the boarding-school for boys 700 and the girls' school 350; a day-school for 600

boys and another for 400 girls being also provided for. No Blue-coat boy ever wears a hat or cap winter and summer. They wear knee-breeches, yellow stockings and long blue coats with a leather belt. Entrance to the Hospital Schools is partly by nomination or presentation, partly by competition; and in regard to two-thirds of the scholars, fees ranging from £10 to £20 may be charged if the parents or relatives are judged to be able to contribute to the child's education and maintenance. Numerous exhibitions and prizes still remain, including exhibitions to the universities. Situated in Newgate street, London, since the 16th century, Christ's Hospital was pulled down a few years ago and the institution removed to Horsham. The new general post-office now stands upon the old site. Camden, Stillingfleet, Coleridge, Charles Lamb and other distinguished men received their education at Christ's Hospital.

CHRIST'S THORN, a small thorny shrub of the order *Rhamnaceæ,* or buckthorn family. It is common in the southeast of Europe and Asia Minor, especially in Palestine. The fruit has a singular appearance, resembling a head with a broad-rimmed hat. The spines are long and sharp, growing on slender vine-like branches which are easily plaited, the flowers rose-shaped. The plant derives its name from its being believed by many to be the plant from which the crown of thorns was made which was placed on the head of our Saviour. The fruit is called jujube.

CHRISTY, kris'tĭ, **Charles,** American minstrel: b. New York 1828; d. Kansas City, Mo., 13 Feb. 1897. He was an actor from boyhood, supporting Forrest and Macready as well as singing on the minstrel stage.

CHRISTY, Howard Chandler, American illustrator: b. Morgan County, Ohio, 10 Jan. 1873. He was educated in the public schools of Duncan's Falls, Ohio; went to New York in 1893, studied at the National Academy and the Art Students' League under Chase. He first attracted attention with his illustrations of the Spanish-American War, published in *Scribner's* and *Harper's* magazines and in *Collier's Weekly,* gaining especial prominence with his 'Men of the Army and Navy' series and a portrait of Colonel Roosevelt. He is, however, best known for his charming illustrations of the works of such authors as the late Richard Harding Davis and has created a picturesque and romantic type of society women peculiarly his own. He prefers black and white, but has also worked with success in color.

CHRODEGANG, or GODEGRAND, Saint, bishop of Metz: b. about 700; d. Metz, 6 March 766. He was a native of Hosbania (Belgian Limburg) and a descendant of a distinguished family among the Ripuarian Franks. Pepin the Short, in 742, appointed him bishop of Metz; in 753 he conducted the Pope on a journey from Rome to Gaul; and in 764 brought from Rome the relics presented by the Pope to the churches and monasteries of Gaul. He was the author of the rule 'Vita Canonica.'

CHROMATES. See CHROMIUM.

CHROMATIC, in music, a succession of semitones, ascending or descending. The chromatic semitone is the interval between any given note and that same note raised by a sharp or lowered by a flat. The chromatic scale consists of 13 tones, the 8 scale tone and the 5 intermediate. It is believed by some that the term chromatic was adopted because the Greeks were in the habits of designating the intermediate tones by characters of various colors.

CHROMATIN, krō'mą-tĭn, a substance in the nucleus of a cell which is readily stained by certain reagents, such as carmine, hæmatoxylin and suffranin, so as to be distinguished from the other substance called achromatin or linin. This chromatin is made up of minute spherical or rod-like particles called "chromosomes." The latter bodies in the course of cell-division are of equal size in the same cell and their number is the same in all the cells of all the tissues of the same species. The chromatin particles are of especial interest because they are supposed to be the bearers of heredity and are thus thought to form the physical basis of this unknown property of organic life. See HEREDITY.

CHROMATOPHORE, a pigment cell. The possibility of change of color in the chameleon, frogs, the squid, etc., is due to certain cells in the cutis which are filled with pigment. These pigment-cells are called chromatophores, and under the stimulus of light may expand or contract. When expanded they are highly ramified and when contracted are roundish. The pigment differs in different individuals and in different parts of the body, being yellow, brown, black and at times even red or green. In the goby (a fish), the chromatophores, which are yellow or greenish-yellow when distended, become orange when contracted; while the orange or red ones, when shrunk, become brown or even black. In the same fish a still different kind of chromatophores are filled with iridescent crystals of marvelous delicacy, which in expansion become visible as spots of metallic sheen. It is on the distribution and different depth in the skin of the chromatophores that the pattern of markings of the skin of changeable animals depend. The common squid is very beautifully tinted, and under the microscope the chromatophores can be seen dilating and contracting, giving off a remarkable play of all the colors of the rainbow. The value of this power, which is under control, is that it gives the animal means of concealment by adapting its color to that of its surroundings.

CHROMATOPSIA, in pathology, signifies colored vision, or an abnormal state of the vision in which colors present themselves independently of the color sensations usually experienced. These sensations are unnatural and generally they are only temporary. They may be caused by drugs, medicines or some temporarily abnormal condition of the organ of sense or that of vision. Frequently objects appear tinted with certain colors, through which the original color may even appear dimly. See COLOR-BLINDNESS.

CHROMATROPE, krō'mą-trōp, or **CHROMOTROPE,** -mō-, a toy consisting of a disc painted with arcs of circles in brilliant colors in such a manner that when the disc is revolved centrifugal or centripetal streams of color seem to flow through it. The term is also applied to an attachment for a magic lan-

tern, by which, on the revolution of two painted discs of glass, kaleidoscopic effects are projected on the screen.

CHROMATYPE, a photographic picture in which the paper employed has been sensitized by some of the salts of chromium.

CHROME GREEN, the green oxide or sesquioxide of chromium, forming a green pigment used by enamelers. It is also employed by dyers and calico-printers as a mordant. A hydrated variety, $Cr_2O_3.2H_2O$, used for the same purposes, is known as "Guignet's green" or "emerald green." "Arnaudon's green" contains some phosphoric acid in addition. These are now used instead of the poisonous greens prepared from arsenic as a base. See CHROMIUM.

CHROME IRON ORE. See CHROMITE; MINERAL PRODUCTION OF THE UNITED STATES.

CHROMIC ACID. See CHROMIUM.

CHROMITE, or **CHROMIC IRON**, the only important ore of the metal chromium and the source of all of the chromium salts. Chemically considered it is a chromate of ferrous iron $FeCr_2O_4$, but it is usually classified by mineralogists among the oxides of the spinel group as a compound of iron protoxide, with chromium sesquioxide, having the formula $FeO.Cr_2O_3$. The metals are often in part replaced by magnesium, aluminum and ferric iron, as in the varieties magnochromite from Silesia and mitchellite from Webster, N. C. The composition of the mineral thus approaches the chromiferous variety of spinel, picotite. Chromite has a hardness of 5.5 and a specific gravity of 4.32 to 4.57. It is usually a granular-massive, black, opaque, metallic mineral, much resembling magnetite. It has, however, a dark-brown streak and is readily distinguished from all black minerals by fusing it with borax and salt of phosphorus, the bead thus obtained assuming an emerald-green color on cooling. It is further identified by its invariable occurrence in serpentine or olivine rocks. It is often disseminated in grains, or rarely in small octahedral crystals, and thus upon the disintegration of the rock the grains are washed into the streams and adjoining bottom-lands. Prior to 1884 it was extensively mined near Baltimore, also at Texas, Pa., and in California, North Carolina and Wyoming.

The production of chromite in the United States experienced a notable expansion in 1916, in the output of 47,035 long tons — more than 15 times the previous record output of 3,280 tons, mined in 1915. This was due primarily to the unprecedented demand for chrome steel for war purposes, but also in large measure to the scarcity of ocean tonnage from Africa and Oceania, which countries had heretofore been depended on as the chief sources of supply. However, in spite of this difficulty in transportation, the importation was 115,945 tons, a gain of 39,490 tons, or nearly 52 per cent.

The United States' production came principally from California, which yielded 92 per cent of the country's total, the remaining 8 per cent being nearly all from Oregon, with small additions from Maryland and Wyoming. Chromite is found in deposits of serpentine, where the latter has been disintegrated by weather and erosion. The black grains and boulders of the chromite accumulate in the surface soil, and in concentrated masses, in connection with magnetite, in the black sands of the streams and beaches. In quality the California chromite ranges up to 48 per cent of chromic oxide, and the Oregon mineral up to 56 per cent.

The importations of chromic iron ore into the United States in 1916 were as follows: From Rhodesia, 61,850 tons; from New Caledonia (French Oceania), 33,936 tons; from Canada, 12,220 tons; and from Greece, 7,000 tons. Asia Minor formerly supplied the United States with about 10,000 tons of chromite annually, but since Turkey entered the European war that source has been cut off.

Under the stimulus of the war demand Canada's output of chromite has been very largely increased, and her exports of the ore to the United States in 1916 exceeded those of 1914 by more than 2,300 per cent. Consult California State Mining Bureau 'Bulletin 38' (Sacramento 1906); Dolbear, S. H., 'The Nature of Chromic Iron Deposits' (*Mining and Scientific Press*, 21 April 1917); United States Geological Survey, 'Mineral Resources of the United States, 1916' (Pt. I).

CHROMIUM (Gr. *χρώμα* "color," in allusion to the colors exhibited by its compounds), a metallic element discovered in 1797 by Vauquelin, in the native chromate of lead of Siberia, and afterward found combined with iron. The metal itself has never been prepared in large quantities, but it can be obtained by the reduction of the oxide by carbon in the electric furnace. It is also obtained by heating the anhydrous sesquichloride of chromium with zinc, potassium or sodium. In nature it occurs most abundantly as the mineral chromite ($FeO.Cr_2O_3$), which is often found as a segregation in ultrabasic rocks such as peridotite.

Most of the world's supply has come from New Caledonia, Rhodesia, Turkey and Greece. In the United States California leads, though there has been a small output from Wyoming and from Maryland. Chromium is extremely hard, of a grayish-white color and less fusible than platinum. Its chemical symbol is Cr, and its atomic weight is 52.1 if $O = 16$, and 51.7 if $H = 1$. Its specific gravity is from 6.5 to 6.8 and its specific heat is about 0.1, though the latter constant has not been determined with precision. Once separated from oxygen, it does not readily combine with it again. It oxidizes superficially, however, upon being heated in air, and it decomposes steam at a red heat.

Chromium forms four different oxides, whose formulæ are respectively CrO (chromium monoxide); Cr_2O_3 (chromium sesquioxide); $CrO.Cr_2O_3$ (chromo-chromic oxide); and CrO_3 (chromium trioxide). Of these the first two act as bases, each yielding a series of salts with various acids. Those salts that are derived from the monoxide, CrO, are called "chromous" compounds; while those that are derived from the sesquioxide, Cr_2O_3, are called "chromic" compounds. Chromium sulphate, $Cr_2(SO_4)_3$, forms a series of alums with the sulphates of potassium and ammonium, the element behaving in this respect like aluminum. (See ALUM). Chromo-chromic oxide is not chemically active. Chromium trioxide, CrO_3, dissolves in water with the formation of an acid, H_2CrO_4, which is called "chromic acid,"

and is of great interest to the chemist. Chromic acid forms a series of definite salts that are known as "chromates." One of the best known of these is chromate of lead, $PbCrO_4$, which is used as a pigment under the name of "chrome yellow," and is formed by precipitating chromate of potassium by a soluble salt of lead. Potassium bichromate, $K_2Cr_2O_7$, or $K_2CrO_4CrO_3$, is another extremely important salt of chromic acid; it is used as a depolarizer in electric batteries, as a bleaching and oxidizing agent and as a convenient starting-point in the manufacture of many of the chromium compounds. It possesses the peculiar property of rendering gelatine insoluble upon exposure to light, and for this reason it is used in various photographic processes.

Chromium is used to some extent in the manufacture of steel, as it is found that the addition of less than 1 per cent of chromium materially increases the strength, hardness and elasticity of the product.

In medicine chromic acid and potassium bichromate are used. The acid is employed as a caustic; the bichromate is now rarely employed because of its irritant properties.

Poisoning by chromium compounds is similar to that caused by other metallic poisons. The drinking of battery fluid is the usual mode. There is severe gastro-enteritis, nausea, vomiting of yellowish bloody matter, diarrhœa, pain, colic, tenesmus, great prostration, muscular cramps, rapid and feeble pulse, bloody urine (perhaps suppression of this secretion), feeble and irregular breathing, with coma or convulsions preceding death. A fatal ending may occur in from 4 to 15 hours. At times this result may be delayed and symptoms referable to degenerative processes in the liver and kidneys appear. Treatment is by prompt and continued washing of the stomach. Bismuth subnitrate is indicated in the after treatment, which is symptomatic.

CHROMIUM, or **CHROME STEEL.** See CHROMITE; and CHROMIUM.

CHROMO-LITHOGRAPHY, a method of producing a colored or tinted lithographic picture by using various stones having different portions of the picture drawn upon them with inks of various colors and so arranged as to blend into a complete picture. Sometimes as many as 20 different colors are employed. It was invented by Alois Senefelder, of Prague, between 1796 and 1800. An outline drawing is first traced, and then transferred to the various stones, one for each color. The artist puts in the colors, with soap, of the tints required. Next the slab is put upon a press and carefully damped with a sponge, after which the oil color is applied with a leather roller. The parts of the slab which contain no drawing, being wet, resist the ink, while the drawing itself, being oily, repels the water while retaining the color. In printing, the lighter shades are printed off first and the darkest last. See LITHOGRAPHY.

CHROMOSOME. The entire body of an animal or plant is built up of cells; each cell consists of protoplasm and a nucleus and is usually surrounded by a cell wall; the nucleus consists of chromatin and its derivatives. During nuclear division the chromatin appears in the form of definite pieces called *chromosomes*. This name, meaning color bodies, was given because the pieces stain intensely with certain dyes. The general appearance of chromatin in the resting nucleus is shown in Fig. 1A; Fig. 1B shows the chromatin after it has assumed the form of definite chromosomes during the division of the nucleus.

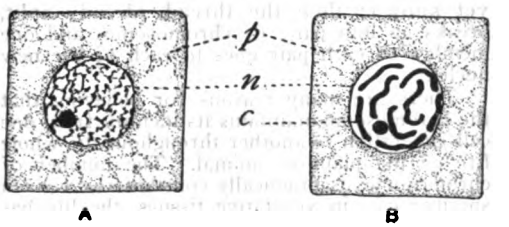

FIG. 1.— Two cells from the root tip of an onion. *A*, resting condition. *B*, early stage of division. *p*, protoplasm; *n*, nucleus; *c*, chromosome.

Since 1880 investigations dealing with chromatin in the resting condition, but more particularly with nuclear division when the chromatin is obviously in the form of chromosomes, have increased in number and in the extreme minuteness of their details. For a diagrammatic outline of nuclear division and the behavior of the chromosomes during this process, see the article on CELL. In regard to the details of nuclear division, there have been two strongly defended theories, one of which may be called the linin-chromomere theory and the other the vacuolization theory. The first assumes that the chromatin is in the form of granules rather regularly arranged upon or embedded in a substratum called linin. The granules, or chromomeres, divide and their division splits the linin thread, so that each chromosome produces two new chromosomes (Fig. 2).

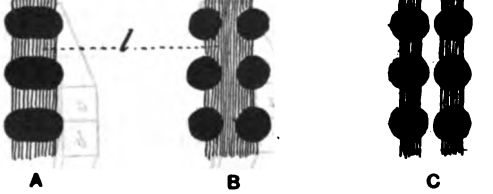

FIG. 2—Diagrammatic representation of a single chromosome according to the linin-chromomere theory. *A*, single chromosome consisting of a linin band, *l*, and chromomeres, *c*. *B*, the chromomeres have divided. *C*, the linin has split between the two pairs of chromomeres, so that two new chromosomes have been formed.

All the chromosomes of the nucleus divide simultaneously and are distributed so that each of the two new nuclei not only receives half of the chromatin of the preceding nucleus, but half of each chromosome. This theory is satisfying to the philosophical mind, but practically all botanists have come to the conclusion that it is not supported by the facts. Most botanists accept the vacuolization theory. According to this theory vacuoles appear in each chromosome and increase both in number and extent until the group of vacuolated chromosomes constitutes the familiar network of the resting nucleus. Thus, there is only one sub-

stance, the chromatin. The substance which in the other theory is called linin is only the more attenuated portion of the chromatin. As division begins the attenuated portions are withdrawn and the chromatin condenses until the solid chromatin thread appears. This thread splits longitudinally, by some mechanism not yet known; then the thread, already split, breaks up into pairs of chromosomes and one member of each pair goes to each of the new nuclei.

There are many reasons for believing that the chromosome maintains its identity from one cell generation to another throughout the whole life of the plant or animal. The number of chromosomes is practically constant for a given species; e.g., in vegetative tissues, the lily has 24, trillium 12, canna 6, the mole cricket 12 and man has 24. If the nucleus of an egg be removed and a single sperm introduced the nuclei of the resulting embryo have only half the normal number of chromosomes. If a normal egg be fertilized by two sperms, the resulting embryo shows one-third more chromosomes than the normal. If the two species with different chromosome numbers be crossed, the resulting embryo shows a number equal to the sum of the numbers found in the sperm and the egg. Some very competent investigators claim they can see the chromosomes outlined in the network of the resting nucleus. Still further evidence might be cited to prove that the chromosome is a permanent organ of the cell.

The number of chromosomes is doubled by the union of the sperm and the egg during fertilization. At some subsequent point in the life history, before sperms and eggs are formed

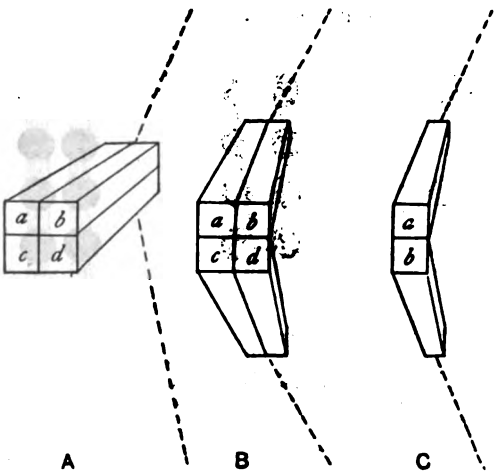

FIG. 3 — Diagram of the reduction divisions. *A* and *B*, two stages in the first division; *C*, a stage in the second division. *A* represents a pair of fused chromosomes, one member of the pair consisting of *a* and *b*, the other of *c* and *d*. *B*, the two members of the pair are being separated. *C*, the next division, the two parts of each member of the pair are being separated.

again, there is a reduction in the number of chromosomes. The most generally accepted view is that the reduction is due to the fusion of chromosomes in pairs. The number becomes reduced during two peculiar, successive divisions, called the reduction divisions (Fig. 3).

Most botanists and many zoologists believe that the chromosome is the sole bearer of hereditary characters. The male and female at fertilization contribute not only equal amounts of chromatin but, in most cases, the same number of chromosomes; and this is the only equal contribution. In some cases, as in the lily, the male contributes nothing but a nucleus, which consists, essentially, of chromosomes. If the nucleus of an egg be removed and the sperm of another species be introduced the resulting embryo has only the characters of the sperm parent. Other evidence might be added. It has been established that the chromosomes are not all alike and that different chromosomes may have different functions. In insects, and in some other forms, it has been shown that one chromosome, differing in appearance from the rest, is concerned in the determination of sex (See PLANTS, SEX IN). In mutation (q.v.) it has been proved that the chromosome content of the nuclei of the mutating form differs from that of the parent plant and it seems probable that the change in the chromatin was the cause of the mutation.

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CHARLES J. CHAMBERLAIN,
Professor of Morphology and Cytology, University of Chicago.

CHROMOSPHERE, the gaseous envelope which exists round the body of the sun, through which the light of the photosphere, an inner envelope of incandescent matter, passes. During total eclipses it is observed that a red-colored envelope surrounds the sun and shoots up to great distances from the surface. It seems to have been first recognized by Secchi; and the projecting portions of it are commonly described as "red-colored protuberances" and "red flames." To this red envelope the name "chromosphere" was given by Lockyer. The light from it is much fainter than that from the photosphere; and till 1868, when M. Janssen and Mr. Lockyer almost simultaneously pointed out a method of viewing it, it was never seen except during eclipses. See SUN.

The spectrum of the chromosphere was first observed in 1868 during the Indian total eclipse, and it was found to consist of a number of bright lines, and conspicuous among them those of hydrogen. The light of the chromosphere was thus proved to be due to masses of incandescent vapor or gas, hydrogen forming a large part of the whole.

Since the invention of the Janssen-Lockyer method of observing, as it is called, very remarkable advances have been made in our knowledge of solar physics, discoveries quite unthought-of having followed. The observations are made by means of a combined telescope and spectroscope. A spectroscope is substituted for the eyepiece of the telescope, the slit of the spectroscope being placed at the principal focus of the object-glass of the telescope. The slit is capable of being moved in such a way that any particular band of the image formed in the object-glass of the telescope may be examined by the spectroscope.

The spectroscope employed for the purpose of examining the chromosphere must have the greatest possible dispersive power, and requires for this purpose a very long train of prisms.

As was mentioned above, the spectrum of the chromosphere consists of a series of bright lines. The breadth of a bright line of the spectrum is not sensibly increased by increasing the dispersive power of the spectroscope, but the contrary is the case with a continuous spectrum, which is extended by dispersion. Thus the latter becomes weakened, while the former maintain their brightness and become more easily visible in comparison with it. The slit of the spectroscope being arranged so as to take in a band, either tangential or radial, close to the edge of the image of the sun formed by the object-glass of the telescope, it is found that the bright lines of the chromosphere are perfectly visible, in spite of the light of the continuous spectrum proceeding from the inner portion of the disc. Further it has been found possible, by using a spectroscope of the very highest dispersive power, and by opening the slit sufficiently wide, to see the whole of one of the protuberances at once, and by this means to watch its motions and its changes. To understand this the reader must consult the article SPECTROSCOPE. He must recollect that a continuous spectrum consists of an enormous number of images of the slit, placed side by side, and in ordinary cases slightly overlapping each other. If we could employ an infinitely narrow slit we should have an infinite number of infinitely narrow images, and no overlapping whatever. But suppose a light to consist of only two or three colors, say light from a source capable only of giving the two bright lines C and F, that is, one in the red and another in the blue part of the spectrum. It is easy, even with a slit of sensible width, to keep the two from overlapping, and we shall see without any confusion the two bright lines or bands at different parts of the spectrum, darkness intervening. Now imagine a bright prominence starting up from the sun's surface, and let the spectroscope be directed on its image in the telescope; there will be only portions of the slit illuminated by it, portions corresponding to the shape of the flame, and if the flame contain only light of the bright line C and F, there will be seen two images of the prominence at the points of the spectrum belonging to these colors.

It will readily be seen from the explanation just given that if the general background of the field has been made faint enough (by a high dispersion), it may be possible to open the slit so widely that the entire prominence may be seen in its true form, in either of the regions, C or F, of the spectrum. The images seen in this way are, however, formed only by light of one particular wave length: if the point of the spectrum selected is that upon which there falls a line due to hydrogen, then the image seen will be that arising only from the hydrogen in the prominence; whatever other elements there may be will have no effect, and we shall, in fact, see the exact form and distribution of that portion of the cloud which is composed of hydrogen alone.

A remarkable application of this principle is made in the so-called spectro-heliograph, an instrument invented by the American astronomer, G. E. Hale, and first successfully employed by him in the year 1891. Here all light is screened from the field except that coming through the very narrow slit of the spectroscope, this slit being sufficiently long to include the whole object observed, or even the entire sun's disc. By letting the sun's image sweep over the slit, every part is successively seen by the light of a single wave length, and thus we may view the distribution of the hydrogen solely, or of the calcium, or of the other elements upon or about the sun. Finally, by allowing the very narrow, moving image of the slit to fall upon a photographic plate, we may obtain a photograph of the sun from a single selected element which it contains, provided only that there emanate from this element a line of sufficient brightness for this purpose.

The glowing prominences sometimes extend to great heights above the sun's surface: though the usual depth of the chromosphere is but from 5,000 to 10,000 miles, material has been observed at times of great eruptive disturbance to extend to a distance of no less than 400,000 miles — a distance nearly equal to the radius of the sun itself. While, generally speaking, all the elements of the sun are found in the lower regions of the chromosphere, it is only the lighter ones which attain these enormous altitudes in the eruptive prominences, and the opposite is true of the constitution of the great, comparatively quiescent chromospheric clouds which lie above the photosphere. Thus Jewell has found that in the high levels of the envelope there are hydrogen, helium, parhelium, magnesium, sodium and ytterbium, while at the low levels are chromium, iron, cobalt, nickel, manganese, yttrium, cadmium, zinc, carbon and vanadium. Several substances, notably calcium, give contradictory results, the average level being sometimes high and sometimes low; as only very minute quantities of some substances are required to produce spectral lines, however, the apparent discordance is not surprising.

From minute displacements of well-known lines in the spectrum (see SPECTRUM ANALYSIS) motions are inferred of the incandescent bodies from which these lines are proceeding. On this principle motions of the fixed stars have been determined. Thus Sirius is approaching us at the rate of 10 miles per second, and Arcturus is approaching us at the rate of five miles per second. The principle applied to the results of the spectroscopic examination of the prominences of the chromosphere, as well as a direct observation of their apparent movement across the line of sight, shows that they are due to enormous outbursts of gases and vapors from the sun. These gases are sometimes projected outward or even tangentially with extraordinary velocities, rates of motion so high as 300 miles a second having been reported. In some cases the apparent motion of a single cloud may be a perspective effect due to the successive formation of many clouds over an extended area, yet it is quite certain that in many of the cases the enormous velocities observed are real, and it is probable that they may be in part, at least, due to electrical action. But much is still to be learned, not only as to the true cause and movements of the eruptive prominences, but also in explanation of the clouds which are nearly quiescent for a

considerable length of time, though so near the enormously distributed region of the sun's photosphere.

Bibliography.—The most recent, semi-popular, but authoritative, work is 'The Sun,' by C. G. Abbot (1911); this contains many references to more detailed or extended publications. A larger and very important recent work is 'Physik der Sonne,' by E. Pringsheim (Leipzig 1910). Numerous papers will be found in the 'Proceedings' of the Royal Society (London), the *Astrophysical Journal* (Chicago), and in practically all journals devoted to general astronomy and to astronomical spectroscopy.

CHROMOTYPE. See CHROMATYPE.

CHRONIC (Gr. *χρόνος*, "time"), a term applied to diseases which are of long duration, and mostly without fever. It is used in opposition to the term "acute," which is applied both to a poignant pain and to a disease which is attended with violent symptoms, terminates in a few days and is attended with danger. On the other hand, a "chronic" disease is slow in its progress and not so generally dangerous.

CHRONICLE, a history recounting in order of time all details which observation or tradition has furnished the author. It may be a universal history, or may deal with a single epoch, nation, city or individual. Some chronicles have been preserved from early ages; the Old Testament Chronicles (q.v.) are a type of such. An important ancient chronicle, discovered on the island of Paros in 1627, and known as the 'Chronicle of Paros,' is an outline of Greek history, originally covering the period from the reign of the legendary Cecrops, king of Athens (1582 B.C.) to 264 B.C. The last part, from 355 B.C., is now lost. It omits many important political and military events, and deals more fully with the art and festivities of the people. In the early Christian ages, ecclesiastics were generally the authors of the chronicles; for example, Eusebius, bishop of Cæsarea, collected from other historical works his 'Chronicle of Ancient History.' Hieronymus of Stridon translated it into Latin in the 4th century, and others continued it. Many historical works of the Byzantine historians are also chronicles. Most of the mediæval chronicles were by monks, especially by the Benedictines, who usually began their story with the creation of the world, and gave an abridged history of the events from the first chapter of Genesis to the immediate subject of their narrative. In their statement of facts they in general knew little distinction between fabulous and true history, were not inclined to question much either visions or miracles, and were accustomed to dwell as long on unimportant as on momentous events. Chronicles are valuable for determining historical facts when, like that of Eusebius, they contain materials from older works which are now lost, or when they relate events contemporary with a writer, and of which he was a witness; and they are always valuable as an illustration of the spirit of an age and the sentiments of a people. It is through them that nearly all the history of the Middle Ages has been preserved. Every European people has numerous mediæval chronicles.

Among the German chronicles may be mentioned that of Regino, abbot of a monastery in the forest of Ardennes, whose work extends from the Christian era to 907; that of Hermannus Contractus, entitled 'A Chronicle of the Six Ages of the World,' to the year 1054; that of Lambert von Aschaffenburg, which recounts the period from the beginning of the world to 1050 in brief, and from 1050 to 1077 in detail; that of Godfrey of Viterbo, giving a universal history to the year 1186, written partly in prose and partly in verse, and entitled 'Pantheon'; and a chronicle found in the collection of Pistorius, composed by an Augustinian monk, which extends from the Christian era to 1474. These were written in Latin and, with many other Latin chronicles, were collected and published at Hanover in a series of volumes entitled 'Monumenta Germaniæ Historica.' The oldest historical book in the German language is a rhyming chronicle, consisting of 83,000 verses, written by Ottokar von Horneck, in the 13th century, and of nearly the same antiquity are the chronicles of Rudolf von Ems and Jansen Enekel, both having the form of poems and furnished with notes by their authors. France is rich in chronicles, universal and particular, written in Latin, French and various provincial dialects. It was the fancy of the earliest chroniclers to give to France a Trojan origin. Eginhard, the son-in-law of Charlemagne, chronicled the deeds and talents of that emperor in his 'History of Charlemagne.' The first of the chroniclers who wrote in the popular language of France was Geoffroi de Ville-Hardouin, who lived in the 12th century, and was an actor in the events which he describes. The 'Chronicles' of Froissart (q.v.) embrace the events occurring from 1325 to 1400 in England, Scotland, France, Spain, Brittany and the Low Countries, setting forth in detail the feasts, spectacles and all the pageantry of feudal times, and enlivened throughout by Froissart's shrewd comments and observations. Of the strictly English chronicles, the earliest is that by Geoffrey of Monmouth, a monk of the 12th century, tracing the history of Britain through a series of imaginary kings, from Brutus, a son of the Trojan Æneas, who founded the British state many centuries before the Christian era, to Cadwallader, who was said to have lived 689 A.D. There is also the 'Anglo-Saxon Chronicle,' extending from the beginning of the Christian era to the death of King Stephen (see ANGLO-SAXON LITERATURE). The collection of chronicles edited by Holinshed in 1577 embraces a history of England to that year, a history and description of Ireland by Stanihurst, and a history of Scotland translated by Hector Bœthius. 'The Chronicle of the Kings of England,' by Sir Richard Baker, published in 1643, is a history of England from Roman times to the death of King James I. It was a very popular work and was afterward continued to the death of George I, but is not now considered accurate history.

CHRONICLE OF THE KINGS OF ENGLAND. See CHRONICLE.

CHRONICLE OF PAROS. See CHRONICLE.

CHRONICLES, Books of. The books of Chronicles were originally one book in the Hebrew, which is also true of Ezra and Nehe-

miah. Further, it is now a generally accepted conclusion that these two books, Chronicles, and Ezra and Nehemiah, were written by the same author and were, when composed, a single work. The reasons for this conclusion are the following:

Ezra is the direct historical continuation of Chronicles. Further, two verses at the end of Chronicles are repeated at the beginning of Ezra, a duplication which is supposed to have occurred when the division was made. Also, the characteristics of both works are the same. These are particularly a fondness for genealogies and also for the treatment of religious matters, especially those things which pertain to the temple and the work of the priests and Levites. Again, both are marked by the same unusual late linguistic peculiarities.

In Chronicles the passage which apparently indicates the latest date is 1 Chron. iii, 19–24, where the sixth generation after Zerubbabel in the line of David is mentioned, which would be about 350 B.C. The text of the passage is, however, somewhat doubtful; the Septuagint reading indicates the 11th generation. Nehemiah contains clearer evidence of a late date. The high priest Jaddua, of the time of Alexander the Great, is mentioned, Nehemiah xii, 10f; 22f. Further, the description of Darius as the Persian, Nehemiah xii, 22, would be unnecessary and unnatural while the Persian empire was in existence, and implies that at the time of the writer that empire belonged to the past. Hence the writer lived probably about 300 B.C., but possibly later than that.

1 Chronicles i–ix contains the history of the Hebrews from Adam to Saul; x–2 Chron. ix, the history from the death of Saul to the death of Solomon; 2 Chron. x–xxxvi, the history of Judah only, without Israel, to the end of the Babylonian captivity in 537. When this history is compared with the parallel accounts in the books of Samuel and Kings it shows many omissions and also many additions. The omission of the entire history of the northern kingdom, Israel, is specially notable. The whole of the material of 2 Sam. ix–xx, except the account of the wars with the Ammonites, is omitted. This is particularly significant because the omitted portion gives an account of the failings of David and the unfavorable side of his court and family life. The additions are concerned chiefly with the activity of the Levites and the prominence of the temple and ritual matters. An example of a long addition is 1 Chron. xxii, 2–xxxix, 30, of which only xxix. 23a, 27, is from a known source, i.e., from 1 Kings. The additions show an idealized view of the history, representing the P code as in force in the time of David.

It is evident that the sources used by the writer included some of the canonical books, principally the books of Samuel and Kings, with the Pentateuch and Joshua employed less extensively. The material from these canonical books is largely in the form of verbatim extracts, with omissions and additions, but not rewritten. The author also refers to other sources under at least 15 titles, such as: The Book of the Kings of Judah and Israel, 2 Chron. xvi, 11; The Book of the Kings of Israel and Judah, 2 Chron. xxvii, 7; The Midrash of the Book of the Kings, 2 Chron. xxiv, 27, etc. It is obvious that several of the titles refer to the same work, and that is possibly the case with all. The principal source used by the writer, then, aside from the canonical books, is a work covering the history of Israel and Judah; whether any other sources are referred to is uncertain. It is probable that the material from the extra-canonical source or sources is rewritten. At any rate, the portions not drawn from the canonical books all have the same peculiar late style.

The historical value of the portions of Chronicles not derived from the canonical books is uncertain. Much of the material is distinctly improbable, some being quite out of harmony with the earlier material from the canonical books. On the other hand, it cannot be asserted that there is no historical element in this added material. The evidence is not sufficient to afford a positive judgment in every case. The religious standpoint of the book is that of the time of the writer, and he puts that standpoint into the earlier time. The historical value of the book is largely that of showing the religious standpoint of about 300 B.C.

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GEORGE R. BERRY,
Professor of Old Testament Interpretation and Semitic Languages, Colgate University.

CHRONICLES OF THE CANON-GATE, a collection of Sir Walter Scott's stories published in two series. The first series (1827) contains 'The Highland Widow,' 'Two Drovers,' and 'The Surgeon's Daughter'; the second series (1828) contains 'The Fair Maid of Perth.'

CHRONICLES OF CLOVERNOOK, a story by Douglas Jerrold, published in 1846. Clovernook is a "hamlet wherein fancy has loitered away a truant hour"; and under the guidance of the "Hermit of Bellyfulle" the author explores Clovernook, and discourses of it. The book charms by its quiet humor, the grace of its fancy and the benevolence which characterizes even its satire.

CHRONICLES OF FROISSART. See CHRONICLE.

CHRONICLES OF THE SCHÖNBERG-COTTA, shĕn'bĕrg kŏt'tä, **FAMILY,** a novel by Mrs. Elizabeth Charles, published in 1863. It is the story of a family during the period of the Reformation in Germany, as told chiefly by Friedrich and Else, the oldest children. The book is written with an effort after the archaic style, and has much of the simplicity and directness of the old chronicles. It is interesting and has proved a great favorite, though accurate scholarship finds fault with its history.

CHRONOGRAM, a device by which a date is given in Roman numerals by printing certain letters of an inscription larger than the others; as in a motto of a medal struck by Gustavus Adolphus in 1632: ChrIstVs DVX;

ergo trIVMphVs. The value of C and the other capitals equals 1632, MDCXVVVII.

CHRONOGRAPH. See CHRONOSCOPE.

CHRONOLOGY, the science of dates, or of arranging events in order of time. Two steps in human progress were requisite for its existence: the invention of material records, since memory would not transmit exact sequences of events on any considerable scale; and the adoption of some recurrent astronomical period, neither too short nor too long, as a measure of time. The pictograph, developed into a system of writing, and the Peruvian quipu, or knotted cord, are the chief of the former. The fixing of the year by the Babylonian astronomers was the only feasible specimen of the latter; the month being too short for a measure of long periods and even the year becoming too formidable in numbers for the limited counting power of the ancients. Between the creation of these raw materials, however, and the construction of a simple and universally applicable system for even one country, thousands of years elapsed in which the chaos of unsystematic systems is still the difficulty and often the despair of antiquarians.

For a satisfactory chronology there is a third requisite,—a fixed epoch to count from, no matter what: as in Babylonia the accession of Nabonassar; in Greece the hypothetical institution of the Olympian games; in Rome the imaginary foundation of the city; in Christendom the arbitrarily fixed birth of Christ; with the Mohammedans the Hegira of the Prophet, etc. But, obvious as this seems, it is in fact a very late device of civilization. Herodotus and Thucydides, in the most splendid intellectual age of Greece, wrote history without a date, or any apparent recognition that one was needed. The sequence of events was preserved; but that these need be related to an arbitrary point in the past is an artificial conception, created by the accumulation of practical inconveniences. These would seem to have differed in each country which independently invented it: the scientific and business ones in Assyria, historical in Greece, administrative in Rome. Others borrowed the system when its utility was manifest; but older societies were satisfied with a ruder scheme. Their science and business was alike undeveloped; their historical sense was satisfied with a few dramatic episodes, and even the order of events was heroically confounded; and when it became necessary to keep public records, their unit was a reign, or they dispensed with units altogether and dated by some notorious event. Thus the Babylonians dated their business and official tablets "the year he brought Nannar of Nippur into a house," "the year he overran Karkhar," "the year he overran Karkhar a second time," "the year divine Bur Sin became king," etc.; on exactly the same principle as a modern mother dates events in the year the second child had the measles. Dating by the year of a certain king's reign is a natural system, still preserved in English statutes: they are not the laws of 1663 or 1860, but "4th Car. II," "24th Victoria," etc.

In Assyria, as early as the 14th century B.C., a system was begun of dating by "eponyms," or the names of the chief officers of state, in annual succession, with the chief events in the year; each new king's name being entered on his accession. Thus: "Edsur-sarabe governor of Gozan. Revolt in city of Ashur. In month Sivan sun was eclipsed." (Three intervening entries). "Pan-ashur-lamur governor of Arbela. Revolt in city of Gozan. Pestilence." In Rome, it was "in the consulate of" certain persons; in Athens, "in the archonship of"; and so on. Obviously, if the regular succession of functionaries is preserved for a long time, as in Assyria it was for centuries, it will furnish a perfect chronology provided one date can be fixed in the series. This has been done in several cases, and the chronology of some sections of ancient history has been accurately reconstructed over long periods. The most certain authentication is by some astronomical phenomenon whose date can be fixed by calculation; and several of these priceless data are casually mentioned by old records or historians. Thus, the mention by an Egyptian papyrus of a rising of Sirius, in connection with the overflow of the Nile, fixes the accession of Usertesen III, fifth king of the 12th dynasty, between 1876 and 1873 B.C.; the oldest certain year-date or approximate date in history yet discovered, and by a happy chance, in a country the most empty of chronological data. (The Babylonian Naram-Sin's date as near 3750 B.C. is now quite discredited). The most usual of these phenomena recorded are eclipses of the sun, from the terror inspired by the darkening of the sky; fortunately for history, as the mention of them has furnished several invaluable dates. The Assyrian eponym canon for several centuries has been fitted with accurate dates by the eclipse recorded in the first entry above, 763 B.C.; the same one is mentioned in the Bible (Amos viii, 9) as occurring in the reign of Jeroboam II. Even when we cannot be certain by itself which eclipse was meant, it is rare that other synchronisms do not fix the limit. Thus, an important date in the kingdom of Lydia is determined by an eclipse which was either 610 or 585 B.C., and other circumstances make the latter date probable.

When positive evidences fail, the only method of research is by *synchronism*, or fixing the date of an event by its connection with some other event or person of known date. Fortunately the records afford considerable help in this, if less than could be wished; they mention international battles, captures, treaties, appeals, threats, correspondence, etc., where one date must apply to both. Noted examples of this are the biblical records as to relations of Palestine with Assyria, Egypt, Tyre, etc.: sometimes confusing events and dates, occasionally confounding persons, and needing correction from other sources, but still of extreme value. Another specimen is the Assyrian "synchronous history" of the relations between Assyria and Babylonia, a tablet of about 800 B.C. When we come down to classic times, these synchronisms are the very basis of historical work on those periods. There is also a synchronism of arts, products exchanged between countries, systems of writing, etc., and even to some extent of institutions; which, though demanding expert knowledge and careful judgment, is often of the first value. On this basis much of the Homeric and pre-Homeric history of Greece is taking shape, and even the origins of China can perhaps be related to Babylonia.

The chronological sense of different races

presents extreme diversities; but it is fairly accurate to say that none of the older ones had any appreciable amount except the Babylonians, and that in them and their pupils, the Assyrians, it was early and remarkably developed. Their dated records (in the primitive fashion above) go back to the third millennium B.C. at least; the Assyrians' eponym canon antedates by many centuries any similar attempt elsewhere; and the Babylonians were much the first to adopt an epoch. On the other hand, their cofounders of the earliest civilization, the Egyptians, were utterly destitute of it; and the dates in their history back of the time of close contact with Babylonia, where synchronism can be utilized, are almost pure guesswork. Beyond 2000 B.C. the divergences of estimated Egyptian dates among the most authoritative scholars vary from 500 to 1,500 years, and even down to 1500 B.C. there is often 100 or 200 years' difference; and only the vaguest inferential proof is available. The Hindus, the Chinese, the Jews, the Greeks, were nearly as devoid of chronological instinct. The case of the great Greek historians has been mentioned; and the vague Jewish "forty years," for a generation or an indefinite long time is familiar and not conducive to accurate chronology.

The obscurity due to lack of dates in general was of course enhanced by the fact that each state counted from its own events or persons, so that in place of one problem, the historical antiquary has scores. The chief method — for many ages the only one — by which this Babel of chronologies was finally reduced to uniformity over large areas was political absorption and the disuse of provincial systems. Even when fixed epochs came to be adopted, though the continuity of history was assured, the international confusion was not lessened nor comparative chronology made easier, as each selected a different epoch; and the same remedy only was operative here. Nor, indeed, for some time did even the individual system become the accurate instrument of research it is now; for the succession was not at first of years, but of annual magistrates, as with the Assyrians, Athenians and Romans sometimes more vaguely of kings and priests. Moreover, with one dubious exception the date of the epoch was not that of its adoption, but centuries back; and the dates affixed by the new systems to former events were often wildly fanciful, as was that of the very event which furnished the starting point. The first epoch ever used, so far as known, was the accession of Nabonassar of Babylonia 747 B.C.; it is generally believed to have been used from the beginning, but this is less probable now than formerly. The Roman era was the foundation of Rome, somewhere about 750 B.C. according to Roman writers; it is not known when it was first adopted, but probably not before the 2d century B.C. The Greek reckoning was from the alleged foundation of the Olympic games in 776 B.C., quite as apocryphal as the other; it was first used as a basis of calculation by Timæus of Sicily in the 3d century B.C. It furnishes a scientific one when the year of the Olympiad is mentioned, which is not always, so that a margin of three years is left. Note the curious fact that all three epochs begin within a quarter century or so of each other, though the last two are merely guesswork. It seems incredible that the year, apparently the most simple and obvious of natural units, was first suggested and used in 194 B.C. by Eratosthenes, the great Greek editor, mathematician, geographer and chronographer. Of course it had been employed for thousands of years as a unit within other units, such as reigns, but not alone in sequence from a fixed epoch. The Olympiad, however, for reasons given below, held its own till the middle of the 5th century. Even after the official adoption of the Christian era,— which, like its predecessors, antedated its use by centuries,— centuries elapsed still before it was employed to the exclusion of other systems. Many other methods of dating, local or ecclesiastical, flourished besides it, and made nearly as much labor necessary in modern as in ancient times to synchronize dates. An acquaintance with these is indispensable to the study of the chronicles, charters and other legal and Church documents of the Middle Ages.

Still another cause of the imperfection of early chronological methods was the difficulty found by the masses in grasping large numbers. Hence, it became the practice to divide the time into cycles of a small number of years, and number by the years in a cycle. The Olympiad was a refined form of this. Our own system of reckoning by centuries is another, only by its decimal form it expresses both ideas at once. Instead of saying "the 3d year of the 20th century," as "the 3d year of the 40th Olympiad," we use a term of addition, and say "nineteen hundred(s) and three." The Chaldæans had their saros of 6,585⅓ days, or 18 years; the Romans, their indiction of 15; and the Chinese and other Asiatic nations still use a cycle of 60. The European cycles, however, as the metonic of 19 years still used for computing Easter, were mostly used to regulate the calendar rather than to compute dates; but they are often extremely useful as an additional method of verifying these.

Babylonian: Era of Nabonassar.— This prince seems for a very brief time to have thrown off the Assyrian yoke and restored Babylonian independence. It was almost immediately lost; but he succeeded in imposing a new dating system which convenience maintained, or else later gratitude looked back to him, under the glories of Nabopolassar and Nebuchadnezzar, as the pioneer of Neo-Babylonian greatness. At any rate, the era is fixed at 26 Feb. 747, from astronomical data collected in Chaldæa by Callisthenes, a general of Alexander the Great. It is the basis of the once famous Canon of Kings, or Mathematical Canon, preserved in Ptolemy's works, and previous to the era of archæology our one source of Mesopotamian history. The Alexandrian Greeks also used this era till their adoption of Julius Cæsar's reformed calendar, 25 B.C. The Babylonian year was different in length from the Julian of 365¼ days, and the conversion of Nabonassar years into years B.C. is a matter of delicacy, necessitating a knowledge of the month and day for certainty. Tables have been drawn up for this purpose.

Olympiads.— It is now pretty generally admitted that the early lists of victors in the Olympic games are fictitious, and that the foundation of the games cannot be assigned a date, our first authentic knowledge beginning with the 6th century B.C.; but this is indifferent to the method

of calculation which assumes a beginning in 776 B.C. They were celebrated every fourth year in the summer solstice; and as the Olympic year began sometimes with the full moon before and sometimes with the one after the solstice, to save trouble and perpetual recomputation it was reckoned as beginning the 1st of July. Hence, the Olympic years cannot be synchronized with ours year by year: the second half of the one corresponds with the first half of the other, and the month must be known for accurate conversion. Therefore, in years before Christ, when the event happened between January and June, inclusive, subtract the number of the Olympic year from 776. Thus: the oligarchy of the Four Hundred was desposed in June Ol. xcii, 1: $4 \times 91 + 1 = 365$; $776 - 365 = 411$ B.C. Socrates was executed in May Ol. xcv, 1: $4 \times 94 + 1 = 377$; $776 - 377 = 379$ B.C.. If it took place in the latter part of the year (as did the immense majority of the familiar incidents in Greek history — all the great battles, for physical reasons, the deaths of Pericles and Cleon, etc.), subtract the sum as aforesaid from 777. Thus, the battle of Platæa was fought in September Ol. lxxv, 2: $4 \times 74 + 2 = 298$; $777 - 298 = 479$ B.C. If the year is after Christ, subtract the number of the Olympic year from 776 in the first case, from 777 in the second. The Olympiad was only used by historians; it is never found on coins or inscriptions. A new Olympiad was instituted by the Roman emperors, beginning with 131 A.D., and is used on some coins and inscriptions, but struck no deep root.

Macedonian Era, or Era of the Seleucidæ: also called by the Jews *Era of Contracts*, because their Syrian governors compelled them to use it in civil business, and styled by the writers of the books of Maccabees the *Era of Kings*.— This epoch dates from the foundation of the Syro-Mesopotamian monarchy by Seleucus Nicator, Alexander's general; assumed to begin with his occupation of Babylon 311 B.C., 12 years after Alexander's death. It was used not only in the Seleucid empire, but by the Greek states on the east coast of the Mediterranean generally; was followed by the Jews till the 15th century, and is said to be in use by some Arabians even yet. It was the great Eastern date for many centuries, but it is one of the most difficult to convert into terms of Christian years, from the astonishing variety in the beginnings of the year (which in different countries and among different sects varied from the vernal equinox to 28 October), and from the variation in length of year, some using the Egyptian year of 365 days, some the Julian of 365¼. The usual computation is to place the beginning of 312 Seleucid on 1 September in the Julian year preceding the first of our era. Therefore, to reduce a Seleucid date to ours, subtract 311 years 11 months.

Era of Alexander.— This is used by some Greek historians, dating from his death 325 B.C.

Era of Tyre.— This begins 19 Oct. 126 B.C. To reduce it to our era, subtract it from 126 if B.C., subtract 125 from it if A.D. This date is used only on medals and in the acts of some councils.

Era of Rome.— The date of the foundation of Rome, as related to the Olympian-epoch, is differently assigned by different authors: by Fabius Pictor at Ol. viii, 1, autumn (747 B.C.); by Polybius at Ol. vii, 2 (750); by M. Porcius Cato at Ol. vii, 1 (751); by Verrius Flaccus at Ol. vi, 4 (752); by Terentius Varrò at Ol. vi, (753). As all the dates were figments, each Roman writer followed which he chose, and sometimes varied from one to another. Livy generally follows Cato, sometimes Fabius Pictor; Cicero follows Varro, as does Pliny, in general; Dionysius of Halicarnassus follows Cato. The modern writers usually follow Varro, supported by Censorinus, who specifically says the festival of the Palilia in April was the anniversary of the foundation. The Romans had two kinds of year: one for business, public or private; and the consular year, which their annalists follow. The former began with the calends of January. The latter had no fixed time of beginning, but commenced with the installation of the consuls, which happened as chance and politics dictated; it is the one generally used by the Latin and Greek historians down to the 6th century A.D., however. But in the computations of the Roman era the year begins with 21 April. After Cæsar's regulation of the calendar, the year began with January, much to the disgust of the Roman poets, who thought the spring was the real beginning, as, of course, it is.

Cæsarean Eras.— Several attempts were made to establish time eras from actions of Cæsar and Augustus, one of them very successful. The *Cæsarean Era of Antioch* commemorated Cæsar's victory at Pharsalia 48 B.C.; it was used by Evagrius in his 'Ecclesiastical History.' The Syrians and Greeks, however, placed its beginning 11 months apart. The Julian era began 1 Jan. 45 B.C., and commemorated the reformation of the calendar by Cæsar. The *Era of Spain* or *of the Cæsars* commemorated the completion of the conquest of Spain by Augustus, and began 1 Jan. 40 B.C.; for many centuries it was the one era of Spain and Portugal, and generally of the Roman provinces subdued by the Visigoths, not only in the Iberian Peninsula, but in southern France and in Africa. Several of the councils of Carthage, and that of Arles, also dated from this, though after the 9th century the year of the Incarnation was usually joined with it. It was not disused in Castile till 1382, and in Portugal not altogether till 1422 or later. The calendar being Julian, all its dates are reduced to ours by merely subtracting 38. There was an *Era of Actium*, commemorating that battle, fought 3 Sept. 31 B.C. The Romans began it 1 Jan. 16 Julian (30 B.C.); the Egyptians, 29 August; the Eastern Greeks (who used it till the 9th century), 2 September. The latter called it the *Era of Antioch* (not the one mentioned later), and that city struck medals with it. There was also an *Augustan Era*, beginning 27 B.C., the year in which Augustus received that title.

Jewish Eras.— The Jews came under foreign rule before they had invented an epoch, or even developed periodic magistrates; and their annals, except for synchronisms, are nearly as baffling as the Egyptian. Their first internal chronology is after the Macedonian era was forced on them by the Seleucid officials; their religious matters, however, were regulated by their own calendar, in which the civil and sabbatical year began (as now) about the autumnal equinox, the ecclesiastical and legal year about the spring equinox. They also made computations of the time from the Creation (see paragraph below), but their dates do not depend on

it till modern times. After the Dispersion they were obliged to conform to the periods of other nations, in order to have their festivals celebrated uniformly; and they adopted a cycle of 84 years (a transformed Greek cycle). The time of its beginning is not certain, one author placing it at 162, and another at 291 B.C. In 46 B.C. the Christians adopted it, and used it partially till the Council of Nice; they then, and the Jews in 360 A.D., substituted the metonic cycle of 19 years, which the latter still employ. Till the 15th century they continued to date from the Macedonian era; since then they have adopted a Creation era, which they date 3,760 years 3 months B.C. Their dates cannot be reduced to ours without expert knowledge of their involved calendar.

Creation Eras.— To emphasize their separation from paganism, and avoid participation in pagan observances connected with the calendar, the Christians early began to reckon time from the supposed date of the creation of Adam according to the Jewish Scriptures. Aside from its resting only on the adding up of impossible and inconsistent genealogies, the problem was further confused by there being three texts of equal authority to work from,— Hebrew, Samaritan and Septuagint,— all irreconcilably variant. One author collects 120 different computations of the true date; another says he has collected over 200; and 300 have been reckoned; and the estimates vary over 3,500 years, from 3,483 to 6,984 years before the Christian era. None of them have any scientific standing, but for two centuries the Christian world generally accepted as a working hypothesis Archbishop Usher's (1650) figure of 4004 B.C., which is still used in some Bible appendices and similar works. Several earlier ones, however, obtained considerable footing, and two of them are not yet disused. It is of course as useful as any other arbitrary point, like the Olympic Games or the foundation of Rome; and has the advantage of requiring only one continuous figure, in place of a break in the centre like the Christian era. But its controversial character, and the satisfaction of marking off the time after Christ's coming as the beginning of a new era, have caused the latter system to supplant it. Of the others, the chief are: (1) *Era of Constantinople*, still employed in the Greek Church, and used by the Russians till the time of Peter the Great. This begins 5,508 years 4 months before the Christian era. The civil year begins 1 September; the Church year on the spring equinox or 1 April. To find the current year corresponding to a Constantinople year, if the event took place before 1 September, subtract 5,508 from the date; if later in the year, subtract 5,509. (2) *Era of Alexandria.* This was adopted by the Christians of Alexandria on the computation of Julius Africanus, who reckoned 5,500 years from the creation of Adam to the birth of Christ, but placed the latter three years earlier than the current reckoning, so that our era would begin 5503 Alexandrian. After the accession of Diocletian in 284, however, they dropped 10 years, both from the year since the Creation and since the Incarnation, making in fact two eras instead of one. To convert this era into our own, in the first eight months of the year subtract 5,502 up to and including 5786 Alexandrian, after that date, 5,492; in the last four months, 5,503 and 5,493 respectively. This era was used by the Coptic Church till the 15th century, and is still retained in the Abyssinian. (3) *Era of Antioch.* The Syrian Christians, early in the 4th century, adopted Julius Africanus' reckoning as above, but dropped 10 years from it as the Alexandrians had already done; placing the Incarnation, however, as in our own era, three years later than the Alexandrian. As regards the Creation, therefore, the two eras are seven years apart up to Diocletian's time, and then coincide; as regards the Incarnation, the Antioch is three years less before that time and seven years later after it. Dates in this system are reduced to ours, as in the reformed Alexandrian calendar above.

Era of Diocletian, Subsequently Named Era of Martyrs.— At the same time that the Alexandrians changed their Creation era as above, they established a new and shorter one from the accession of Diocletian, 29 August (first of the Egyptian year) 284. The second name given implies that an attempt was made to start it from 303, the date of Diocletian's edict of persecution, but if so it was unsuccessful, as indeed a mere perpetuation of a strife was likely to be. The era is still used by the Copts of Egypt and the Abyssinians. The change from the Egyptian to the Julian calendar, and the peculiar complications it has introduced into the conversion from that era to ours, are too intricate to detail here. To make the change, add to their date 283 years 240 days in common years; if the date is between 30 August and the end of the year in the one before leap year, add 283 years 241 days. But the Ethiopians do not reckon the years continuously from the beginning: at the end of each 532 years (that is, 28×19, or the solar and lunar cycles multiplied together) they begin again with 1.

The Christian Era.— It is not generally realized how modern this epoch is in general use. It was introduced into Italy 533 A.D. by Dionysius Exiguus ("the lean"), a Roman abbot; was not introduced into Gaul (France) till the 8th, and not in current use there till the 9th; and came into use in England only in the latter part of the 8th. In Latin countries the current scheme before that was the cycle of indiction (below). Any uniform date is so useful that its defects may be overlooked. That of having a double set of numbers, forward and back, is not serious. Perhaps the chief inconvenience in calculating backward is that of calling the year preceding the era 1 B.C. instead of 0; thereby making the leap years on the backward series fall on the odd years, 1, 5, etc., or else making 7 years between the first one previous and the first one after. Astronomers rectify this by calling the first year previous 0. (For the different dates on which the beginning of the year has been placed, see CALENDAR). Dionysius fixed the birth of Christ in 754 of the Roman era, but he began the year 1 with the Annunciation, 25 March of the year preceding. In ecclesiastical and common usage it has begun at Christmas, Easter, 1 March, and other dates. In England from the 7th to the 13th century it was on Christmas; in the 12th the Annunciation began to be used as well, and from the 13th till 1752 remained paramount. The different beginnings of the year must be carefully taken into account in studying mediæval history.

Cycle of Indiction.—This was a period of 15 years, whose object has been already explained. It was generally used in the Western or Latin empire for several centuries before the Christion era became general. It began in the year 313, or was referred to that year as a start. There were three, differing only as to the beginning of the year: (1) The Constantinopolitan, beginning in September, like the Greek year; generally used in the Eastern or Greek empire and sometimes in France. (2) The Imperial or Constantinian, attributed to Constantine the Great, called also the Cæsarean. It began 24 September, and was used by old French and English chroniclers. (3) The Roman or Pontifical, beginning on Christmas or 1 January as custom varied; often used in papal bulls, and sometimes in old French writers. To find the number of any year in the Indiction, add 3 to the date (our era), divide by 15, and the remainder is the number. If the remainder is 0, the year is the fifteenth or last of the cycle.

Armenian Era.—This starts from the Council of Tiben, 9 July 552, when the Armenian schism began by condemnation of the acts of the Council of Chalcedon. The Armenian civil year is the Egyptian year of 365 days, out of all measure with others; their ecclesiastical year begins 11 August, and has the Julian calendar. They also use the Creation era of Constantinople along with their own, dating documents with both on occasion. In business with Europeans they employ our era and our year. To convert their civil dates to our era, multiply the number of Armenian years by 365; add the number of days from 1 January to the given date; subtract 176; the remainder will be the number of days from 1 Jan. 553 to the given date; reduce this to Julian years, add 552, and this gives the date in the Julian year, old style. Add the requisite number in the Gregorian calendar if desired. In ecclesiastical reckonings, add 551 years 223 days. In leap years, if the date is between 1 March and 10 August, subtract one day from the above.

Mohammedan Era.—This commemorates the Hijra or Hegira (flight) of the Prophet from Mecca to Medina, 622 A.D. It does not, however, date from the flight, but from 68 days previous, 16 July, or as some have it, 15 July. The methods of computation are too complicated and uncertain to be given here: Mohammedan chronology is one of the most treacherous of subjects, and even experts disagree and go astray.

Persian or Gelalæan Era.—This begins with the accession of Yezdegird III to the throne of Persia, 16 June 632. Till 1079 the Persian had the random Egyptian year, 365 days without intercalation; it was then reformed by Omar Khayyam, the great poet and astronomer, under Malek Shah, to a degree almost as accurate as the Gregorian. There were seven successive leap years once in four years, but the eighth was deferred till the fifth year. This method was once universal in Persia, and is still followed by the Parsees of India. Owing to the days of error accumulated by the old year, the day of beginning is thrown back, so that the Persian year can be converted into ours by adding 631.

Hindu Eras.—The philosophers divided the duration of the world into four *yugs* or ages, of which three are past, and the present corrupt one, the *kali-yug*, is alone historical. It begins 3101 B.C. and includes several others in use. The Era of Vikramaditya, from a Hindu Augustus who may or may not be historical, is reckoned from 57 B.C. This monarch is generally attributed to the 5th or 6th century if real, and the epoch is thought a sidereal one. The Era of Salivahana is 78 A.D. This is used in southern India, and commemorates an equally dubious ruler. The Fusli era, used in revenue transactions all over India, is not uniform, but the most usual begins 590 A.D.; it seems to be a Mohammedan one, and to correspond roughly to the Hegira. The Bengali era is another of the sort, and is set at 631. There are also others which are used in different provinces. The 60-year cycle is employed, its date being variously set.

Chinese Chronology.—This rests on cycles of 60 years, the mathematical tribunal fixing their start at 2277 B.C. But since 163 B.C. the Chinese writers have used periods called Nien-hao, each beginning with the accession of some emperor, and named after him, as with English laws, and ending when he or some successor chooses to begin a new period. Tables of Nien-hao are therefore needed to identify the years.

FORREST MORGAN,
Connecticut Historical Society.

CHRONOMETER (Gr. *χρόνος*, "time"+ *μέτρον*, "measure"="time-measurer"), an instrument designed to measure time with great accuracy, and much used in scientific work, for the determination of longitude at sea, and in the regulation of clocks and watches by makers and repairers. The marine chronometer bears a strong superficial resemblance to a watch, except that it is larger and is mounted upon gimbals, so that the motion of the ship may affect it as little as possible. In its mechanism it differs from a watch chiefly in the design of its escapement and balance-wheel. The usual form of escapement, as invented by Le Roy about 1765 and greatly improved by Earnshaw and Arnold some 15 years later, is shown in Fig. 1. It is known as the "detached" or "detent" escapement. In the figure a spring detent is shown, the spring being at F. This type is the usual one for marine chronometers. For pocket chronometers the spring is omitted and the detent blade G is pivoted.

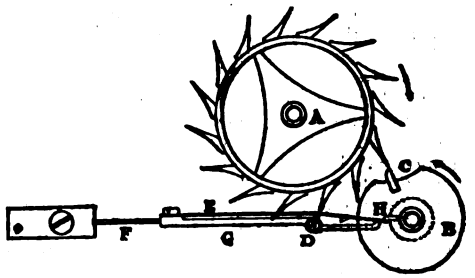


FIG. 1.—Chronometer Escapement.

In the ordinary watch the balance-wheel is in connection with the train of wheels leading from the mainspring continuously, or nearly so; but in the chronometer it is free from these during the greater part of the time, so that its natural period of vibration is more nearly realized. A is the escape-wheel, which is in gear

with the other wheels of the instrument and is prevented from free rotation by means of the locking-pallet, D. B is a disc (technically known as the "impulse-roller") secured to the same staff, or axis, as the balance-wheel. F is the "detent spring," which serves to return the light frame, G, and the locking-pallet, D, to the position they have in the illustration, after the detent has been tripped by the balance-wheel. A set screw is provided for preventing the locking-pallet, D, from being drawn too far into the escape-wheel, but this has been omitted in the illustration for the sake of greater clearness.

When the mechanism is in the state shown, the balance-spring should be free from strain; but the balance-wheel is moving with its maximum velocity in the direction (let it be supposed) of the arrow, so that in another instant the discharging-pallet, H, will trip the detent by momentarily withdrawing the locking-pallet, D. The escape-wheel, A, is then free to rotate until again arrested by the locking-pallet, D; but as it does so it engages the impulse-pallet, C, and accelerates the balance-wheel. After the escape-wheel has been arrested by the locking-pallet, the balance-wheel continues its excursion until the energy of its motion has all been expended in winding up the balance-spring. The balance-spring then preponderates, and the wheel returns to the opposite extreme of its swing without disturbing the locking-pallet, D; the discharging-pallet, H, merely raising the light gold spring, E, as it passes the detent. In most chronometers the balance-spring is made in the form of a helix instead of a flat spiral.

The balance-wheel is also compensated for change of temperature, though this feature can hardly be said to constitute a point of difference between a chronometer and a watch, since practically all of the better grades of watches are similarly compensated. The effect of an increase of temperature upon the rate of a chronometer (or watch) is of a dual nature. If the instrument keeps correct time at one temperature, then, unless some mode of compensation is provided, it will lose time at all higher temperatures, because (1) the strength of the balance-spring is less at higher temperatures, and (2) the wheel itself is greater in diameter on account of its natural expansion, so that it has a greater moment of inertia, and hence responds more sluggishly to the action of the balance-spring. To counteract these effects, as far as possible, certain weights are provided along the rim of the wheel and the wheel is so designed that as the temperature rises these weights are automatically thrown nearer to the axis of rotation. The moment of inertia of the wheel is thereby reduced, and the wheel is caused to respond to the weakened spring with precisely the same readiness as before. The essential parts of the balance-wheel of a marine chronometer are shown in Fig. 2. The rim is divided by transverse cuts into two equal, semi-circular segments, each of which is supported near one end; and it is built up of two concentric metal strips, of which the inner is steel, while the outer (which is twice as thick) is of brass. As the temperature rises the brass expands more than the steel, so that the rim-segments are deflected inward, and the weights, AA, are caused to approach the axis (or "staff") of the wheel. The two masses AA must always be opposite each other, in order that the balance may not be thrown out of poise; but they are slotted so that they may be slid along the rim. If a chronometer keeps correct time at one temperature, but loses at a higher temperature, the compensation is not sufficient, and the masses AA must be shifted toward the free ends of the rim-segments. If it gains at the higher temperature it is over-compensated, and the masses AA must be shifted toward the fixed ends of the rim-segments. In practice it is found to be impossible to adjust the masses so that the instrument shall be perfectly compensated at all temperatures. In fact, the theory of the balance shows that there are only two temperatures at which the chronometer can be expected to keep correct time, though these two may be selected arbitrarily, and the instrument adjusted accordingly. In marine chronometers the temperatures so selected are usually 45° and 90° F., and at intermediate temperatures the instruments will gain. Hartnup, the director of the Liverpool Observatory, concluded, as the result of experiments upon 1,000 chronometers, that the error in rate from imperfect compensation may amount to 1.5 seconds per 24 hours at temperatures 15° F. above or below either of the points at which the balance is standardized, when the balance-spring is of steel. With palladium springs the error is smaller. A more delicate adjustment has been devised, in the form of short arcs of steel attached to the shaft of the wheel at its ends. They are set parallel to the rim and a short distance from it, and at their free extremities carry an adjustable screw. Two are placed on the outside of the long ends of the cut rim, and these check the outward thrust of the rim under the influence of cold, thus automatically shortening the expanding arm. The two placed inside of the rim act in a similar way when the temperature is high, shortening the contracting arms. The practical effort is to bring the extremes of temperature for which the chronometer is regu-

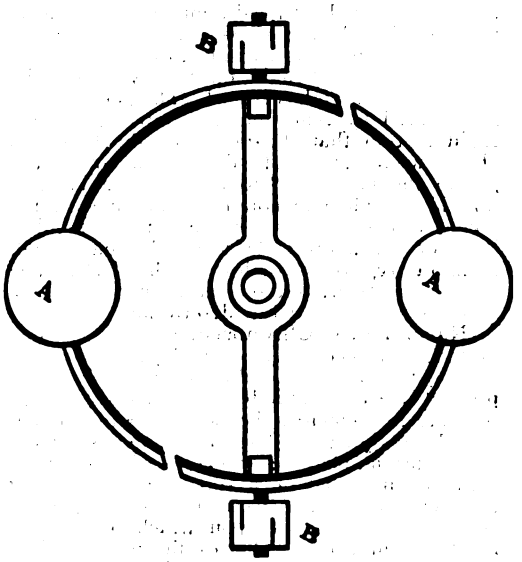


FIG. 2.—Balance Wheel of Marine Chronometer.

lated much closer together and nearer the centre of the scale to be covered, the temperatures above and below these points being taken care of automatically. When the balance has been compensated for temperature as accurately as possible, the moment of inertia of the wheel is adjusted so that the chronometer will keep correct time at the standard temperatures, by means of the slotted nuts BB. These turn upon screw-threads that are secured to the rim near the central arm, where their positions will not be sensibly affected by changes of temperature. If they are caused to approach the rim, the moment of inertia of the wheel is lessened, and the chronometer runs faster; and vice-versa. The slots in BB are provided so that the nuts may grasp their screws spring-tight, and so avoid backlash. Consult Britten, F. J., 'Watch and Clockmakers' Handbook' (New York 1899); Fritts, C. E., 'The Watch Adjusters' Manual' (Philadelphia 1912).

CHRONOSCOPE, or **CHRONOGRAPH,** an instrument contrived to measure the duration of certain short-lived luminous phenomena, such as the electric spark, of which the eye itself can be no judge, owing to the persistence of impressions of light on the eye after the cause of sensation has ceased. The phenomenon is observed by reflection in a mirror, in such rapid motion that the image of the luminous object would appear to describe a circle supposing the luminosity to endure long enough. Should the phenomenon be instantaneous, the image will appear as a mere point; should it last for an appreciable time, the image will form an arc, greater or less, of the circle. The nature and operation of chronoscopes will be best understood by a few descriptions.

Navez-Leurs Chronoscope.— This is one of the most successful of all the pendulum instruments, where the value of the time is expressed in arc. It may be said to consist of two separate instruments, the pendulum instrument and the disjunctor. The pendulum instrument is an upright plate of vulcanite with a graduated arc, mounted on a stand, and supporting two pendulums, two electro-magnets, a pair of springs and the pivot upon which the escapement system works. One of the pendulums is termed the chronometer pendulum and the other the register pendulum; and the magnets are so adjusted one behind each pendulum, that when magnetized by a current of electricity they will just sustain the bobs of their respective pendulums, into both of which a piece of soft iron is inserted. The disjunctor consists of a small stand on which are two pieces of brass, each provided with a pressure-screw, a brass spring, fastened by another pressure-screw, and a cam to work the spring; the brass pieces have platinum points, separated from each other by a short interval, and the spring has also a platinum point below it, which when pressed down by the action of the cam connects the two other points; thus connecting, when requisite, the circuits through the apparatus. The electric currents are obtained by means of voltaic batteries, there being two circuits for an ordinary experiment, one passing through the magnet of the chronometer pendulum on the first screw, the other through the magnet of the register pendulum and the second screw; as both pass through the disjunctor, the simultaneous disjunction of both circuits can be effected by turning the releasing spring, and so disconnecting the platinum points.

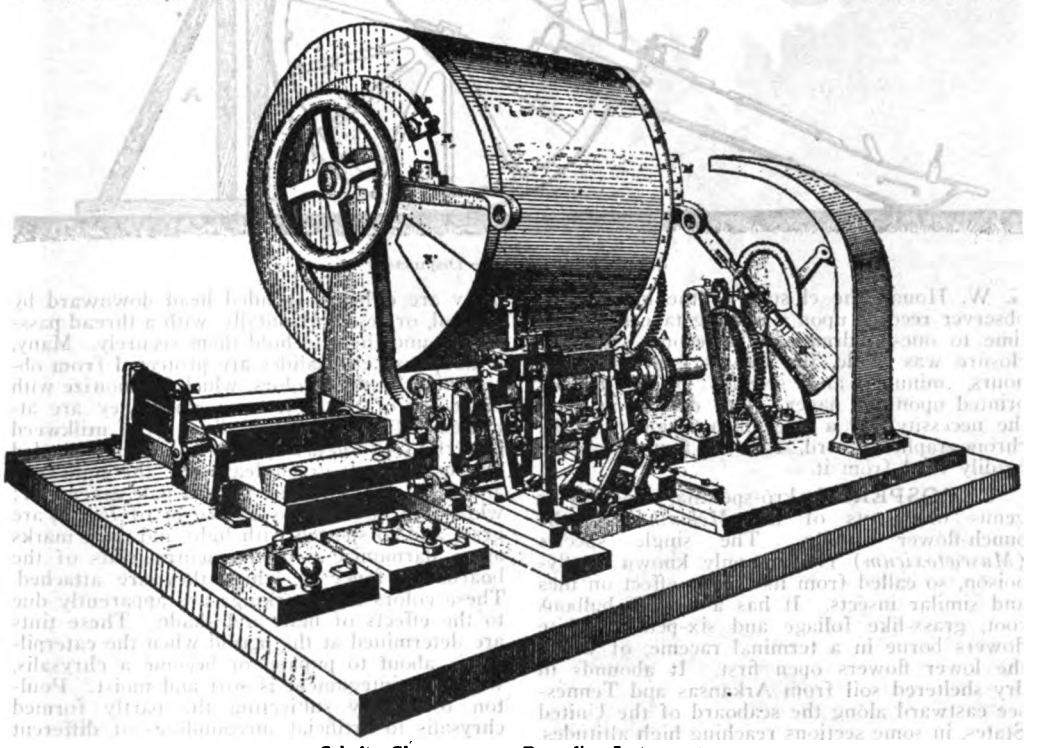
Noble Chronoscope.— The principle of action of this instrument consists in registering by means of electric currents upon a recording surface traveling at a uniform and very high speed, the precise instant at which a projectile passes certain defined points in the bore of a fire-arm. It consists of two portions: First, the mechanical arrangement for obtaining the necessary speed, and keeping that speed uniform; secondly, the electrical recording arrangement. The first part of the instrument consists of a series of thin metal discs, each 36 inches in circumference, fixed at intervals upon a horizontal shaft, which is driven at a high speed by a heavy descending weight through a train of gearing multiplying 625 times. If the requisite speed of rotation were got up by the action of the falling weight alone, a considerable waste of time would ensue; to obviate this inconvenience the required velocity can be obtained with great rapidity by means of the handle. The speed usually attained in working this instrument is about 1,000 inches per second, linear velocity, at the circumference of the revolving disc, so that each inch traveled at that speed represents the one one-thousandth part of a second; and as the inch is subdivided by the vernier into a thousand parts, a linear representation at the circumference is thus obtained of intervals of time as minute as the one one-millionth part of a second. As a small variation in speed would affect the relation between the several records obtained, the uniformity of rotation is ascertained on each occasion of experiment by three observations, one immediately before, one during and one immediately after the experiment, the mean of three observations being taken for the average speed. Some idea may be conveyed of the minute intervals of time which can be measured, from the fact that the distances between the parts of a 10-inch gun at which the time records have been obtained are in some instances only two and four-tenths inches, while the total time the projectile takes to reach the muzzle of the gun — a distance of 100 inches — when fired with a full charge, is about the one-hundredth part of a second. By this means the time may be recorded which the projectile occupies, from the commencement of motion, in reaching different parts of the bore, and from these time records may be deduced the velocity with which the projectile is passing through the different parts of the bore, and the pressures in the gun which corresponds to these velocities.

Schultz Chronoscope.— By means of this instrument, designed for the measurements of very short intervals of time, periods varying from 30 seconds to the one five-thousandth part of a second have been measured with very great approximation, and with great ease and accuracy. It was introduced into the United States for the purpose of determining the initial velocity of projectiles in the proof of gunpowder. A tuning fork, caused to vibrate by electro-magnets, makes an ascertained number of vibrations per second; it traces on the surface of a revolving cylinder a sinuous line showing the beginning and end of each vibration. This sinuous trace is an actual scale of time. The instant at which a projec-

tile reaches any point in its trajectory is by the application of electricity marked upon the cylinder beside the scale of time. The number of vibrations comprehended between any two consecutive marks is an exact measurement of the time elapsing between the instants at which the projectile occupied the corresponding positions in its trajectory. The measurement of time depends on the equality of duration of the vibrations made by the fork; the number of these vibrations in the unit of time is fixed by the construction of the fork. The principal parts of the machine are the cylinder vibrating fork, electro-magnets, the wheel-work, the electric interrupter, Rhumkorff coil, pendulum and micrometer, and, while experimenting the galvanic batteries and targets. The cylinder has a double motion of rotation and translation, given by means of a weight acting on a system of clock-work. The silvered face of the cylinder is covered with a thin coating of lamp-black, which is removed by the trace and spark, exposing the surface in strong contrast to the blackened parts. The vibrating fork stands immediately in front of the cylinder; on each side of it is an electro-magnet to originate, sustain and equalize the amplitude of the vibrations. The left branch of the fork is armed with a flexible quill-point, which, by an eccentric roller, can be made to touch the cylinder at pleasure and thus make the traces upon it. The interrupter is the mechanism by which the current for the fork's electro-magnets is made and broken. In the Schultz Chronoscope at West Point the detached mercury interrupter has been replaced by a light metallic spring, which is pressed against the tuning fork on the inner side of the prong, making the fork its own interrupter when the electrical current is passed through it.

Hipp Chronoscope.— In this instrument a falling weight sets in motion a clock-work which is regulated by a rapidly vibrating spring. Electro-magnets make this clock-work engage and disengage a registering dial. The instrument reads in thousandths of a second.

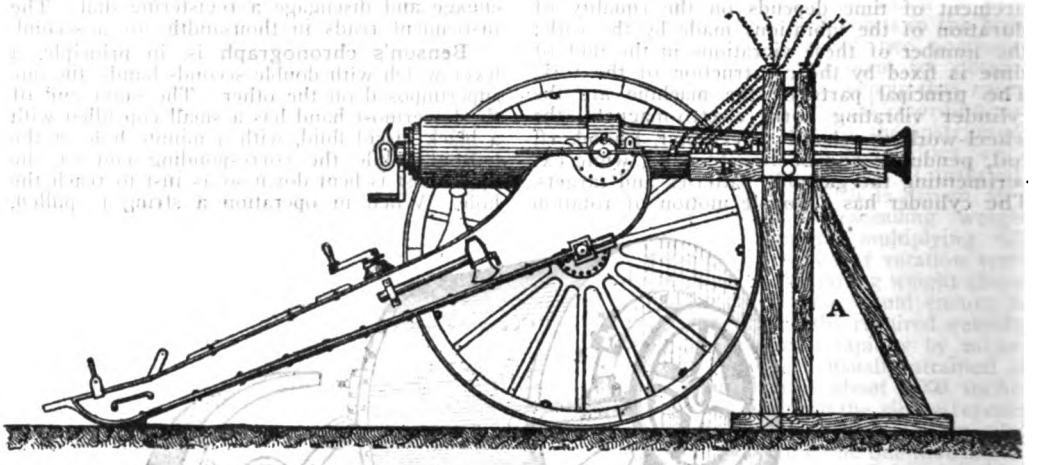
Benson's chronograph is, in principle, a lever watch with double seconds hands, the one superimposed on the other. The outer end of the lowermost hand has a small cup filled with a black viscid fluid, with a minute hole at the bottom, while the corresponding end of the uppermost is bent down so as just to reach the hole. When in operation a string is pulled, whereupon the bent end of the upper hand passes through the hole and makes a black mark on the dial, instantly rebounding. This chronograph, which is sometimes called a stop-watch or a split-second fly-back watch, registers to one-tenth of a second.



Schultz Chronoscope — Recording Instrument.

Very ingenious devices are employed for special kinds of work. Thus for registering the exact times of the "transit" of a moving star across several wires in the field of the telescope, a moving wire is sometimes kept accurately upon the star's image (either wholly by hand or partly driven by a small motor) and at the instant when the moving wire reaches the position of one of the fixed wires the current is automatically closed and the record made. In another device for the same purpose the clock each second uncovers a delicate photographic plate placed at the focus of the tele-

scope; the plate when developed thus shows a series of dots which are the positions of the star at successive seconds. The wires of the instrument are also photographed upon the same plate directly. In this form the plate itself becomes the astronomical chronograph. It should also be mentioned that in a very ingenious form of chronograph invented by



Schultz Chronoscope — Disjunctor.

G. W. Hough the closure of the key by the observer records upon a moving tape the exact time to one-hundredth of a second when the closure was made, the figures expressing the hours, minutes and seconds being directly printed upon the paper. This does away with the necessity for a later measurement of the chronographic record, for the figures can be readily read from it.

CHROSPERMA, krō-spėr'ma, a monotypic genus of plants of the *Melanthaceæ;* the bunch-flower family. The single species (*Muscætoxicum*) is commonly known as fly-poison, so called from its deadly effect on flies and similar insects. It has a longish bulbous root, grass-like foliage and six-petaled white flowers borne in a terminal raceme, of which the lower flowers open first. It abounds in dry sheltered soil from Arkansas and Tennessee eastward along the seaboard of the United States, in some sections reaching high altitudes.

CHRUDIM, Hroo'dēm, Austro-Hungary, town and capital of a circle of the same name of Bohemia, situated 74 miles by rail southeast of Prague on the river Chrudinka. It is a walled town and contains an old church and a Capuchin convent. Its principal industries are the making of sugar, liquors, meal, leather, shoes, cloth and agricultural machinery; and the horse markets held here are the most important in the empire. Pop. 13,017.

CHRYSAL OR THE ADVENTURES OF A GUINEA, a satirical novel by Charles Johnstone, published in 1760. Chrysal, the spirit inhabiting a guinea, passes through many hands, from the prince's to the beggar's, and tells its own story, which is chiefly the adventures of those in whose possession it is for the time being.

CHRYSALIS, krĭs'a-lĭs, the pupa stage in butterflies, succeeding the caterpillar. During this time the insect eats no food, living upon the fat stored up by the larva. (See PUPA). The chrysalides of butterflies differ from the pupæ of moths in being often ornamented with brilliant golden spots which have given origin to the name "chrysalis" or "aurelia." Also the body is often strengthened or protected by tubercles situated on the head, back and sides. They are either suspended head downward by the tail, or rest horizontally, with a thread passing around them to hold them securely. Many, if not most, chrysalides are protected from observation by their colors, which harmonize with the color of the object to which they are attached. Thus, the chrysalis of the milkweed butterfly (*Anosia archippus*) which is suspended among the pale-green leaves of the milkweed and does not hibernate, is of a pale-green tint; while those of *Papilio turnus,* or of *Pieris,* are gray, and so spotted with light and dark marks as to harmonize with the neutral tints of the boards or fence to which they are attached. These colors and markings are apparently due to the effects of light and shade. These tints are determined at the period when the caterpillar is about to pupate, or become a chrysalis, when the integument is soft and moist. Poulton found, by subjecting the partly formed chrysalis to artificial surroundings of different colors, that the breeding boxes, when lined with black paper, produced dark chrysalides; when lined with white, light-colored, or green ones, or when lined with gilt, they produced chrysalides of a distinctly golden color, more completely so than occurs in nature.

Certain chrysalides have been found to exhibit negative phototropism (q.v.); that is, are directly sensitive to light. They will, while suspended by the tail, change their position if sunlight strikes them, and move so as to keep in the shade, from a pendant to a horizontal position, through an angle varying in different species of from 45 degrees to 70 degrees or even 90 degrees. Too much light, especially direct sunlight, seems to be injurious to them, and the movement is one of protection.

CHRYSANDER, krē'săn-dĕr, Friedrich, German music editor: b. Lübtheen, Mecklenburg-Schwerin, 1826; d. 1901. He studied philosophy at Rostock, but later devoted him-

CHRYSANTHEMUM

self exclusively to music. He is best known as the editor of Handel's works, his edition being the first prepared from the autograph scores. He undertook this edition as a private enterprise and with one printer and an engraver and a small hand press completed 97 of the 100 volumes. He was engaged on the work from 1859 to 1894, and introduced various improvements, principal of which were a new German translation of the English text, and the restoration of the original orchestration. Chrysander also prepared a biography of Handel, but of this only two volumes were completed.

CHRYSANTHEMUM, a genus of herbs of the family *Asteraceæ*. The very numerous species are natives most of the cooler parts of the northern hemisphere, but some have become introduced and established in the southern hemisphere as weeds, having escaped from gardens. They are generally hardy, white or yellow-flowered, annual or perennial and of easy cultivation. Except *C. cinerariæfolium* and *C. coccineum*, the flowers of which are used to make insect powder (q.v.), the species have small economic use, though some, notably *C. leucanthemum*, the ox-eye daisy, is a troublesome weed upon badly managed land in the United States. *C. segetum*, the corn-marigold, and *C. frutescens*, the marguerite, are cultivated for ornament, especially in Europe, where they are native.

But the most important species are *C. indicum* and *C. morifolium*. These are the parents of the popular autumn flowers known as "mums" and chrysanthemums, the varieties of which in Europe and America are numbered by thousands, and vary greatly in size, form and color. So great is the diversity that fanciers speak of the varieties as belonging to certain types, of which there are recognized: Single, double, large, small, few-flowered, many-flowered, anemone-flowered and various forms of the ray flowers, such as incurved, reflexed, etc. The size ranges from the "pompon," which may be less than an inch in diameter, to the "show," which may exceed eight inches in diameter. But with all this range of form and color the varieties are almost scentless, or have a somewhat disagreeable odor. These varieties are mainly cultivated under glass, since they do not reach perfection in the open air. They are propagated almost wholly from cuttings, which are taken from the parent plant after it has flowered. The cuttings are grown in a cool greenhouse until spring, when the young plants, then in pots, are placed in partial shade for the summer and kept as stocky as possible. In autumn they are forwarded until they blossom, after which they are destroyed, new cuttings having been taken.

For exhibition purposes the plants are watched and tended with the most minute attention, the superfluous buds and stems being removed while still tiny. Sandy or clayey soil is found useful by various growers, but whatever its character it must be rich and rather porous. Attention to fertilization, watering and cultivation is essential. For outdoor culture the large-flowered varieties are unsuited, but the hardy pompons, which are usually free-flowering, are more satisfactory. Though the season of the indoor chrysanthemum is only about six weeks long, this flower ranks fourth in importance in the United States as a commercial flower, about $500,000 worth being used annually.

The literature dealing with this flower is voluminous, probably ranking next in extent to that dealing with the rose. Eighty-three books are listed by C. Harman Payne in the 'Catalogue' of the National Chrysanthemum Society (1896), and many more have been published in recent years. Other references to literature are given under the title Chrysanthemum in Bailey's 'Cyclopedia of American Horticulture,' which should be consulted for descriptions of various species, types, etc., and for methods of propagation, cultivation and management. Consult also Scott, 'The Show Chrysanthemum and Its Cultivation.'

CHRYSAROBIN, krĭ-să-rō'bĭn, a neutral principle extracted from goa-powder, a substance found deposited in the heart wood of *Vouacapoua araroba*. It is an extremely irritating substance and is not used internally. Externally, combined with an ointment base, it is useful in a number of chronic skin affections.

CHRYSEÏS, kri-sē-ĭs, the daughter of Chryses, a priest of Apollo. She was captured by the Greeks in the Trojan War, and became the portion of Agamemnon. When he refused to restore the daughter at the request of her father, Apollo listened to the prayer of his priest, and sent by his arrows pestilence and death into the Greek camp. Agamemnon found himself obliged to yield up the maiden, but then robbed Achilles of the fair Briseïs. Hence arose the dissension between these heroes which so long delayed the conquest of Troy, and with which the story of the 'Iliad' opens.

CHRYSELEPHANTINE, krĭs'ĕl-ę-făn'-tĭn, in Greek art, statues which were overlaid in ivory and gold. The frame or body of the statue upon which the ivory plates were fastened was usually of wood, and the gold was used for the garments and hair. The most celebrated of these statues were the colossal works of Phidias, of which the largest was the Pallas of the Parthenon, 26 cubits high, representing the goddess in armor covered with a long robe.

CHRYSES, krī'sēz, a name appearing several times in Grecian legend: (1) A priest of Apollo, who, according to Homer, came to the Grecian camp to ransom his daughter Chryseïs, who had become the prize of Agamemnon. (2) The son of Neptune and Chrysogeneia, and the father of Minyas. (3) The son of Minos and the nymph Pareia. He lived on the island of Paros with his brothers Eurymedon, Naphaleon and Philolaus, and was put to death by Hercules because he had, in concert with them, murdered two of his companions. (4) A son borne by Chryseïs to Agamemnon after her return to her father, but alleged by her to be the son of Apollo. He assisted his stepbrother and stepsister, Orestes and Iphigenia, in murdering King Thoas.

CHRYSIPPUS, krī-sĭp'pŭs, Greek Stoic philosopher of Cilicia: d. about 206 B.C. He was distinguished for his skill in debate. He was the principal opponent of the Epicureans, and is said to have written 700 different works, mostly of a dialectical character; but of these no complete work is extant. He died at a great age.

CHRYSIS, a priestess of Juno, who by falling asleep suffered the sacred fire to destroy the temple of her goddess, and was at last burned herself.

CHRYSOBALANÆ, krĭs-ō-băl'ą-nē, a plant family closely allied to the *Rosaceæ,* of which it is sometimes considered a sub-order, comprising 12 genera, with 180 species, all trees or shrubs. Many of them, as the cocoa-plum, produce edible fruits. So do several species of West Africa, the seeds of which are sometimes substituted for or used to adulterate sweet almonds, which they resemble in taste and appearance. From the seeds of a member of the family growing in the Himalayas an oil is extracted.

CHRYSOBERYL, krĭs'ō-bĕr'ĭl (Gr. *χρυσοβήρυλλος,* "golden beryl"), a native aluminate of glucinum (or beryllium), having the formula $GlO.Al_2O_3$, and crystallizing in the orthorhombic system. It is transparent or translucent, with a vitreous lustre and a green or yellow color. The variety alexandrite (q.v.) is green by daylight and columbine-red by artificial light. The finer varieties are used as gems. It has a hardness of 8.5 and a specific gravity of from 3.5 to 3.84. Chrysoberyl occurs in Brazil, in Ceylon, in the Urals and in Ireland; and in the United States it has been found in Maine, Connecticut and New York. See also CAT'S-EYE.

CHRYSOCOLLA, krĭs-ō-kŏl'ą, a hydrated silicate of copper, having the formula $CuSiO_3 + 2H_2O$. It is cryptocrystalline and usually occurs in opal-like or earthy masses, or as incrustations, or not infrequently with botryoidal surface. When pure it is translucent and of sky-blue color, but when impure it is often opaque and dull green, brown or black. Its hardness varies with its composition, from 2 to 4, and its specific gravity from 2 to 2.2. Its lustre varies from vitreous and shining in the pure mineral to dull and earthy. It is found in copper mines in all parts of the world, especially in Cornwall, England, Australia and Arizona. The chrysocolla of the ancients, meaning "gold glue," was apparently a body used to facilitate soldering. The name is still applied to borax which is thus used. Malachite, the green carbonate of copper, was doubtless confused with chrysocolla.

CHRYSOGONUM, krĭs-ō-gŏ'nŭm, a monotypic genus of the natural order *Compositæ.* It is found throughout the eastern seaboard of the United States, in dry soil, from southern Pennsylvania to Florida, blossoming in April and July. It is a perennial herb with large heads of tubular and radiate flowers.

CHRYSOLITE, krĭs'ō-līt (Gr. *χρυσόλιθος,* "bright yellow stone"), a native silicate magnesium and iron, sometimes also containing titanium, nickel or tin. It occurs massive and granular, and also in orthorhombic crystals. It is transparent or translucent, and usually green or yellow in color, with a vitreous lustre. It has a specific gravity of from 3.27 to 3.57 (according to its composition), and a hardness of from 6.5 to 7. Chrysolite occurs in volcanic rocks, as in basalt and basaltic lavas, and it is also found in dolomite and in certain varieties of limestone. The finest crystals of the mineral come from Brazil and Egypt, and are known as "precious chrysolite." They are used to a certain extent as gems, and are sometimes confused with the emerald. Chrysolite readily passes by alteration into serpentine, and numerous large beds of the latter mineral are known to have originated in this manner. It is abundant in crystalline grains in some meteoric irons and stones. Peridot and olivine (qq.v.) are names frequently used for varieties of chrysolite.

CHRYSOLORAS, krĭs-o-lō'rąs, Manuel, Greek scholar: b. about 1355; d. Constance, Germany, 15 April 1415. He was the first who, in modern times, transplanted Greek literature into Italy. The Emperor John Palæologus sent him in 1391 to Italy and England to ask for assistance against the Turks. Having thus become known in Italy he returned there about the year 1395, and was appointed professor of Greek literature at Florence, where he collected around him a great number of scholars of all ages and ranks, and excited universal enthusiasm as much by his dignity and the grace of his elocution as by the extent of his learning. From his school proceeded Leonardo Bruno, Poggius, Francis Philephus and other distinguished revivers of classical studies. He afterward taught with equal success at Milan, Pavia and Venice, and lastly at Rome. Pope Gregory XII employed him in public affairs, and sent him with others to the Council of Constance, where he died in 1415. He should not be confounded with his nephew and companion in Italy, John Chrysoloras.

CHRYSOMELIDÆ, krĭs-ō-mĕl'ĭ-dē, an extensive family of small beetles which have a hemispherical or ovate form, small, sunken head, and antennæ widely separated. All, and especially the typical genus *Chrysomela,* are very gaily colored,— blue, green, golden or a mixture of brilliant tints. The most elegant American species (*C. scalaris*) has the head, thorax and under side dark green, while the wing-covers are silvery white, ornamented with small green spots on the sides and a broad irregular stripe down the middle of the back; the legs and antennæ are rust-red, and the wings rose-colored. These beetles inhabit trees, bushes and plants, feeding, in their larval state, on the leaves. They include many species, as the potato-bug and the elm-leaf beetle, which do vast damage. Their eggs are laid on the leaves, and the grubs, which as a rule are protected by disagreeable odors and exudations, go into the ground to transform, and there spend their pupal life. The family is a very large one and is spread all over the world. See LEAF-BEETLES.

CHRYSOPHANIC, krĭs-ō-făn'ĭk, ACID, the yellow coloring matter of rhubarb. It can be obtained direct from rhubarb by exhausting with benzol and purifying the crude product. It crystallizes in fine yellow tables. It is hardly soluble in water, but dissolves in ether, benzol, etc. With potash it gives a fine purple solution, and thus affords a delicate test for the presence of alkalis. It is also soluble, without decomposition, in strong sulphuric acid. Its acid properties are rather obscure.

CHRYSOPHYLLUM, krĭs-ō-fil'ŭm, a genus of the sapodilla family (*Sapotaceæ*), consisting of trees with milky juice, alternate leaves with numerous transverse closely aggregated ribs, and golden hairs on the under surface. In the West Indies the fruit of *C. cainito*

is esteemed a delicacy under the name of star-apple. It is fleshy, with several one-sided cells, or, by abortion, with one. Seeds nut-like.

CHRYSOPSIS, krĭ-sŏp'sĭs (from the Greek, signifying "of a golden aspect"), a genus of about 20 species of the natural order *Compositæ,* comprising nearly 30 species, natives of North America and Mexico. Commonly known as the golden aster.

CHRYSOPRASE, krĭs'ō-prāz, a variety of chalcedony, colored apple-green by nickel oxide and prized as a semi-precious stone. Silesia and Siberia long furnished a small supply, but later discoveries in California have made it abundant and cheap. It also occurs in Oregon and North Carolina.

CHRYSOSTOM, krĭs'ŏs-tŏm, **Dion** (surnamed COCCEIANUS), Greek orator: b. Prusa in Bithynia about 99 A.D. He was first a Sophist, then a Stoic, and rose into high repute as an orator under Domitian. That tyrant, however, took offense at his freedom of speech, and he was obliged to save himself by flight. He was afterward highly esteemed by Nerva and Trajan. About 80 of his orations are still extant. They are written in an affected style, but notwithstanding form a valuable contribution to our knowledge of ancient philosophy. They appeared first in a collected form at Milan in 1476.

CHRYSOSTOM, John, Saint, archbishop of Constantinople, greatest of the Greek Fathers of the Church: b. Antioch, the capital of Syria, about 347; d. near Comana, in Pontus, 14 Sept. 407. His cognomen, the golden-mouthed (*chrysostomos*), which was given to him after his death, he owes to his extraordinarily rich, fervid and persuasive eloquence. In his youth he attended the school of Libanius, a celebrated Pagan sophist, was his favorite disciple and would have been his successor had he not been won for the service of the Church by his pious mother Anthusa. In accordance with the general usage of that time, he did not receive baptism till he had attained maturity, and then he lived devoted in religious contemplation and studious seclusion in a desert place for six years. There the austerities he practised undermined his strength, and being called back to Antioch by the bishop, he was ordained deacon in 381 and presbyter in 386. By his zeal, his urbanity and his eloquence, he won to the Church heretics, pagans and Jews in great numbers; and his fame spreading to the capital city of the Eastern empire, he was, with the approval of the Emperor Arcadius, chosen to be archbishop of Constantinople in 397. Here he led in the episcopal palace the life of an ascetic, eschewing the pomp and luxury of his predecessors, and out of the revenues of the see maintained numerous charities. Meanwhile his homilies or pulpit discourses, which are still extant, were even a stronger attraction for the masses than the shows of the amphitheatre. But he had many rivals, who left no means untried to blacken his character, his reputation for piety, zeal, disinterestedness and for orthodoxy, and his life was accordingly full of trials and vicissitudes. His enforcement of the Church's laws regarding the relations between ecclesiastics and the female inmates of their households; his deposition of bishops for simony and licentiousness; the restraints he put upon the vagrant habits of the monks, called forth a host of enemies, who brought against him the charge of sympathizing with heretical monks of the Nubian desert who had been excommunicated by their ecclesiastical superior, Theophilus, patriarch of Alexandria. Theophilus now added himself to the malcontents of Constantinople, and he called a synod of bishops to be held in the imperial city to judge Chrysostom. But because of the menacing attitude of the common people, who were to a man loyal to their archbishop, the synod had to be held in the neighboring city of Chalcedon. To this synod Chrysostom was four times summoned, to reply to the charges that were to be made against him, but he ignored the summons, and was declared guilty of favoring the heresies of Origen. By order of the Emperor Arcadius he was exiled to Nicæa in Bithynia; but so great was the commotion of the common people in Constantinople when the degree of banishment was published, that the emperor, alarmed, ordered his recall. The re-entry of Chrysostom to the city was attended with all the pomp of a Roman triumphal procession, and he abated no jot of his zeal for the repression of the evils of Church and state. His language was, as it had ever been, sufficiently emphatic, sufficiently plain-spoken, but his enemies put in circulation a spurious version of the opening passage of his first discourse after his return: he was reported by them to have commenced his address with these words in denunciation of the Empress Eudoxia: "Herodias is again furious; Herodias again dances; she once more demands the head of John." The report was false, but the fate of Chrysostom was sealed. Barbarian troops were brought into the city to overawe the commons while another synod was in session in the city: it confirmed the decree of the synod of Chalcedon. By decree of the emperor, Chrysostom was banished to Cucusus, a place in Mount Taurus. The people of Constantinople, not to be restrained by the garrison of Gothic mercenaries in the city, set fire to the cathedral and the senate house on the day the decree was published; and Chrysostom, though absent, was a more formidable power than ever: his correspondence with bishops, both in the East and West, arrayed the whole Catholic Church against Theophilus and the court of Arcadius. Indignant at the contumacy of the exiled archbishop, Arcadius ordered his transfer to a more inhospitable region still, the desert of Pityos. He died on the way thither in his 60th year. His day in the calendar of the Greek Church is 13 November; in that of the Latin Church, 27 January. His last words are reported to have been "God be in all things praised." His works consist of homilies or discourses suggested by or illustrating passages of Scripture; commentaries on the sacred books; epistles, and treatises on the truths of religion, virtues and vices, etc. Consult Martin, 'Saint Jean Chrysostome, ses œuvres et son siècle'; Perthes, 'Life of Saint John Chrysostom and His Biographers'; Tauscher, 'Life'; both in German; and a biography by Aimé Puech, in English.

GEORGE EDWIN RINES.

CHRYSOTILE, krĭs-ō-tīl, a variety of the mineral serpentine, occurring in silky fibres that are flexible and easily separated. It is commonly greenish in color. Its specific gravity is about 2.22, which is sensibly less than that of ordinary serpentine. It occurs abundantly in Canada, where it is known as "bostonite" and "asbestos." See ASBESTOS.

CHRYSTLER'S FARM, Battle of, the most discreditable American defeat, as Chippewa was the most brilliant victory, of the War of 1812, was fought 11 Nov. 1813. The expedition prepared in the summer and fall of 1813 at Sackett's Harbor, on Lake Ontario, to descend the Saint Lawrence and capture Montreal, started 17 October under bad auspices. Aside from insufficient resources and the lateness of the season, the personnel was hopeless. The commander-in-chief alone would have ruined it. This was Maj.-Gen. James Wilkinson, termed by Scott "an unprincipled imbecile," a mere cunning jobber, of neither military talent, firmness nor even character to be respected, and depised by all the other officers. He had been appointed for the curious reason that New Orleans was not thought safe in his hands. Furthermore, he was prostrated with lake fever, as was his second in command, Morgan Lewis. Boyd, the third, was so incompetent that Jacob Brown, the one able fighting general, had threatened to leave the army rather than serve under him. Men cannot fight without leaders. The flotilla, battered by contrary winds, began the descent of the river 5 November. From this on, the British made progress slow and dangerous. Captain Mulcaster, an able and daring naval officer, with several gunboats, harassed the rear, and 800 regular infantry co-operated with him, pouring musketry and artillery fire on the expedition from the opposite bank whenever possible, besides the batteries at Prescott. Brown's and Macomb's brigades were landed on that side to clear the road; and by 10 November the flotilla had reached the Long Sault, and anchored for the night at Chrystler's Farm on the Canadian side. The next morning Brown marched down beside the rapids with his brigade, and Boyd was ordered to take the rest of the troops, some 2,000, with six field pieces, and guard the rear. Brown reported all clear, and the fleet was about to run the rapids when Boyd reported that the enemy was advancing in order of battle. Wilkinson was sick in bed and could give no orders; so was Lewis; and Boyd was left to fight his own battle. He did it as a weak commander usually does, by detachments, which the British crushed in detail, though they had but 800 against 2,000. The battle lasted from about 2:30 to 4:30, when General Covington was killed and his brigade driven back in disorder. Then the whole American line gave way and retreated in haste. Wilkinson reported 102 killed and 257 wounded, and the British claim to 100 American prisoners is more likely to be true than Wilkinson's report of none. The British reported 22 killed, 148 wounded and 12 missing. The American troops hurriedly re-embarked; the next morning the flotilla ran the rapids to Cornwall. There Wilkinson learned that his colleague, Wade Hampton, had ended operations for the season (see CHATEAUGAY), and at once went into winter quarters. Consult Henry Adams, 'History of the United States,' Vol. VII, Chap. 8.

CHU-HI, choo-hē', Chinese scholar and philosopher: b. 1130; d. 1200. As a student of the Chinese classics, he became widely known through his interpretation of the doctrines of Confucius, and became one of the founders of the Chinese school of speculative philosophy. He had a large number of disciples among the scholars, and they, under his direction, compiled a history of China in 59 books, which is still a standard work.

CHU-KIANG, choo-ky-āng', or **CANTON, RIVER,** the "Pearl River" of the Chinese, is the lower part of the Pe-Kiang, and has a navigable channel of about 300 miles. Opposite Canton it is about one-fourth mile wide, and is crowded with shipping up to 1,000 tons burden; larger vessels must tie up at a point 15 miles below. About 40 miles below Canton it is called "Boca Tigris," or "The Bogue."

CHUAR. Piute Indian name given by Walcott to a thick group of strata of Algonkian Age in the Grand Canyon of Arizona. The rocks are shales with interbedded sandstone and limestone, about 5,000 feet in all. They overlie the Unkar group and are unconformably overlain by sandstone at base of Tonto group.

CHUB, a name given to various species of fishes of the family *Cyprinidæ* (q.v.), of which the river chub (*Hybopsis kentuckiensis*) and the creek chub (*Semotilus atromaculatus*) are the most important in the United States. The name is also sometimes applied to the roach (q.v.), and more rarely to certain marine fishes, as the rudder-fish. The river chub is abundant in rivers and creeks throughout the eastern United States, and may be known by its orange-colored fins and the tuberculate head of the males in spring. It reaches a length of 10 to 12 inches, and is a favorite with the less ambitious anglers in certain regions. The creek chub, or horned dace, is even more widely distributed, and inhabits brooks rather than rivers. It resembles the roach, but has a black spot in front of the dorsal fin and does not exceed a foot in length. The large black chub (*Acrocheilus alutaceus*), of the Pacific Coast rivers, is known locally as chiselmouth, squaremouth and hardmouth. The English chub (*Squalius cephalus*) is a much larger fish, attaining a length of two feet and a weight of eight pounds, and lives in mountain brooks as well as in rivers. It is a game fish of considerable importance.

CHUB-MACKEREL, a fish (*Scomber colias*), found in immense numbers in the Mediterranean Sea. It is the "Spanish mackerel" of England.

CHUBB, Percival, American educator: b. Devonport, England, 17 June 1860. He was educated at Stationers' School, London, and received training for the English Civil Service where he was employed for 10 years on the local government board. He has delivered lectures on literature at the Brooklyn Institute of Arts and Sciences; instructed in pedagogy at Pratt Institute; served as head of the English department of the Manual Training High School, Brooklyn, and as principal of the high school department of the Ethical Culture School

of New York, where he also directed the English courses and produced pageants, festivals, etc. After acting in the capacity of associated leader of the Society for Ethical Culture at New York for a few years and as lecturer on English at the School of Pedagogy of New York University, he went to Saint Louis, where in 1911 he became leader of the Ethical Society. He edited Emerson's 'Selected Writings' (1888); Montaigne's 'Essays' (1891); Pope's 'Homer's Iliad' (with William Maxwell, 1898); Dryden's 'Palamon and Arcite' (1899); Browning's 'Poems'; 'Boy Life'; 'Readings from Howells' (1909); 'Select Writings of Lincoln' (1909); 'Travels at Home' and 'Readings from Mark Twain' (1910). He is also the author of 'The Teaching of English' (1902); 'Festivals and Plays in Schools and Elsewhere' (1912). From 1915–16 he was president of the Drama League of America.

CHUBB, Thomas, English controversialist: b: East Harnham, near Salisbury, 29 Sept. 1679; d. Salisbury, 8 Feb. 1747. He was a mechanic who employed his leisure in the acquisition of knowledge from the best English books which he could procure. In 1715 he published 'The Supremacy of the Father Asserted,' the perspicuity and argumentative skill of which obtained for it much notice. Of course a production assailing the orthodox faith did not pass without reply, and a controversial warfare commenced which lasted as long as his life. Between 1725 and 1732 he offered to the world his thoughts on a variety of topics, moral and theological, in 34 tracts, collected in a 4to volume, of which book Pope in a letter to Gay speaks with great respect. Various publications followed: 'A Discourse Concerning Reason'; 'The True Gospel of Jesus Christ Asserted'; 'Inquiry into the Ground and Foundation of Religion,' etc. His publications were a good deal read in America.

CHUBB LOCK (so-called from the name of the inventor), one of the most intricate of the many-tumbler locks which were first made in England by Barron in 1774. The locks of Chubb have obtained their celebrity partly from their superior workmanship, having more tumblers than usual, with the addition of a lever called the "detector," which is so fixed that, while it does not act under the ordinary application of the key, it cannot fail to move if any one of the tumblers be lifted a little too high, as must be the case in any attempt at picking. The bolt becomes immovably fixed, and thus, while rendering all further attempts at picking useless, gives notice that such an attempt has been made on the next application of the proper key. To draw the bolt after it has been tampered with, it is necessary only to turn the key a little farther forward, as in the process of overlocking; this pushes up a tooth at the end of the detector, restoring the lock to its original position, and the key is then free to turn in the ordinary way. These locks, which were patented as far back as 1818, maintained the reputation of being invincible until the celebrated locksmith Hobbs, of the United States, in 1851 succeeded in picking the most intricate locks of English workmanship, such as Chubbs, Bramahs and Cotterills.

CHUBUT, choo-boot', Argentina, a territory in the northern part of Patagonia, so named from a river which drains a large part of the surface. Its area is about 90,000 square miles. Its principal interest lies in its Welsh settlement, which has remained almost wholly Welsh-speaking. The first settlers, 151, arrived in July 1865. Epochs in its history have been the abandonment of the colony in 1867; the subsequent return from New Bay; a 20 months' nearly complete isolation from the outer world, terminated in 1871. The principal town, Rawson, is situated about five miles from the Atlantic Ocean, and has a population of a few hundreds. English grain and roots are produced, and salt of good quality is found.

CHUCK-WILL'S-WIDOW, a large, nocturnal bird (*Antrostomus carolinensis*) related to the whippoorwill, common in the Southern States of the Union. The name is an attempt to reproduce the note of the bird. It is fully 12 inches in length, and is one of the largest of American song-birds, and when uttering its call, opens its mouth enormously. The eggs are laid upon the ground, little or no attempt being made to form a nest. The bird is a voracious eater of insects, its large bristled mouth fitting it for catching flying objects.

CHUCKWALLA. See LIZARD.

CHUFA. See CYPERUS.

CHUGWATER CREEK, Wyo., a railroad station in Platte County; it is also the name of the Red Beds, an extensive geological formation in Wyoming carrying valuable gypsum deposits.

CHUKOR, or **CHICORE,** a partridge (*Caccabis chukor*), the favorite game-bird of the foothills of the Himalayas.

CHUMBUL, a large river of Hindustan. It rises in Malwa, in the Vindhya Mountains, about 50 miles south of Oojein, flows north, enters Rajpootana, through which it runs northeast, and falls into the Jumna about 90 miles southeast of Agra, after a course of over 650 miles.

CHUNAM, in India, a name given to a very fine kind of quicklime made from calcined shells or from very pure limestone, and used for chewing with betel (q.v.). It is also used for plaster, being mixed with fine sand by wetting, and sometimes with various other materials added. It makes a plaster of great durability, capable of being highly polished, and suitable for decorative work. Both fresh and fossil shells are used for making chunam. Extensive beds of fossil shells employed for this purpose occur in the south of India, particularly in low, marshy places near the seacoast. The chunam from Madras is among the best made. The shells used are first very carefully cleaned; they are then calcined in kilns, with wood charcoal. When chunam is to be used for plaster, it is mixed with fine river sand and thoroughly beaten up with water. The name is applied also to a weight for gold used in northern India.

CHUNAR-GHUR, chŭn-är'gĕr, India, town, fortress and invalid station in Hindustan, 17 miles southwest of Benares, on the Ganges. The fortress stands on a lofty rock rising abruptly from the river. Chunar was stormed by the British in 1764, and formally ceded to the East India Company in 1768. Pop. about 12,000.

CHUNG-KING, choong-kēng', China, city in Szechwan, on the Yang-tze-Kiang, at its junction with the Kia-ling. It was declared open in 1890, and has become one of the most important commercial centres of western China. It is surrounded by a strong stone wall, about five miles in circumference and pierced with nine gates. The climate is neither pleasant nor healthful. The vice-consul of the United States writes that the trade of Chung-King in 1915, although less than in 1914, was more than in other years. The value of the trade of the port was as follows: Net foreign imports, $5,322,888; net native imports, $5,980,186; exports, $10,120,803; total, $21,423,877. The number of vessels entered and cleared at Chung-King during 1915 was given as follows: Chinese vessels of foreign type 120, tonnage 31,627; Chinese junks 1,905, tonnage 85,793. There was a rebellion of the natives here in 1896–98, which checked progress. A railroad to centre at Chung-King is projected, and the exploitation of valuable products awaits the realization of this plan, since in size and potential wealth Szechwan surpasses all other provinces. Pop. about 702,300.

CHUPRAH, chŭp-rä', or **CHAPRAH**, India, a town in Bengal, on the Gogra, near its junction with the Ganges, 32 miles west-northwest of Patna. It is narrow, but extends along the river for four miles. It has government courts and offices, government English schools, and is the station of a German Lutheran Mission; a Roman Catholic Mission was also started within recent years. In 1901 the population was 45,901, or nearly 12,000 less than in 1891, the decrease being mainly due to a plague outbreak and the attendant exodus shortly before the census. The plague has visited the town several times since; between November 1902 and February 1903 there were 2,138 deaths from the epidemic.

CHUQUISACA, choo-kē-sä'ka, Bolivia, department in the southeastern part of the country, bounded on the north by the department of Santa Cruz, on the east by Brazil, on the south by Paraguay and the department of Tarija and on the west by the departments of Oruro and Potosi. Its area is 26,417 square miles. The eastern portion is mostly level, the mountainous parts being in the west. There are large forests and grazing lands, and the soil, where cultivated, is found good for agriculture. Mineral deposits exist, the most valuable being silver, of which some is mined. Among the other productions are wheat, coffee, sugarcane and cacao. The capital of the department is Sucre (q.v.) which was formerly the capital of the republic also. The population is estimated at 230,000, embracing about 85,000 civilized and 8,000 uncivilized Indians.

CHURCH, Albert E., American mathematician and military officer: b. Salisbury, Conn., 1807; d. West Point, N. Y., 30 March 1878. He was educated at West Point and was professor of mathematics there 1834–78. His mathematical works include 'Elements of Differential and Integral Calculus' (1842); 'Elements of Analytical Geometry' (1851); 'Analytical Trigonometry' (1857); 'Elements of Descriptive Geometry' (1865).

CHURCH, Alfred John, English translator and author: b. London, 29 Jan. 1829; d. 1912. He was educated at Lincoln College, Oxford; was ordained in the English Church in 1853; professor of Latin in University College, London, 1880–88; and rector of Ashley, Gloucestershire, 1892–97. He published translations of Tacitus and Livy. His tales retold from the classics and reconstructions of the histories of the ancient empires of Greece and Rome won him wide popularity on both sides of the Atlantic. 'His Memories of Men and Books' was issued in 1908.

CHURCH, Sir Arthur Herbert, English chemist: b. London, 2 June 1834; d. 31 May 1915. He was educated at King's College, London, the Royal College of Chemistry and Lincoln College, Oxford. He was professor of chemistry in the Royal Agricultural College, Cirencester, 1863–79; and filled the same position in the Royal Academy of Arts from 1879 to 1911. He was the discoverer of the animal pigment known as turacin, and of churchite, a native cerium phosphate. He published 'Precious Stones' (1883); 'English Earthenware' (1884); 'The Laboratory Guide' (7th ed., 1894); 'Food' (16th thousand, 1901); 'Josiah Wedgwood' (1894); 'Color' (1887); 'Guide to Corinium Museum' (1910); Chemistry of Paints and Painting' (1901).

CHURCH, Benjamin, American soldier: b. Duxbury, Mass., March 1639; d. Little Compton, R. I., 17 Jan. 1718. He commanded forces with distinction in King Philip's war and in the famous battle of 1675 with the Narragansetts won renown. He captured and executed King Philip in 1676. 'Entertaining Passages Relating to King Philip's War' were compiled from his notes by his son Thomas.

CHURCH, Benjamin, American physician: b. Massachusetts about 1710; d. 1776. He graduated at Harvard; became noted for his patriotic writings during the decade preceding the Revolutionary War, and was a leader in the "Boston tea-party." He secretly corresponded in cipher with the British, and, being detected, failed to exculpate himself. He was lost at sea while on a voyage to the West Indies.

CHURCH, Francis Pharcellus, American editor: b. Rochester, N. Y., 22 Feb. 1839; d. New York city, 11 April 1906. He was the first publisher and editor of the *Army and Navy Journal*; afterward, with his brother, he established and edited the *Galaxy Magazine*. He was a leading editorial righter on the New York *Sun*, and till his death was a proprietor of the *Army and Navy Journal*.

CHURCH, Frederick Edwin, American landscape painter: b. Hartford, Conn., 4 May 1826; d. New York, 7 April 1900. His earliest productions were views of the Catskill Mountains, among which he resided, and a view of East Rock, near New Haven, which attracted very favorable notice. In 1855 he visited South America, and found in the magnificent scenery of that country materials for several of his most admired pictures. After his return he executed his 'View of Niagara Falls from the Canadian Shore,' regarded by many as the most successful representation of the great cataract. Among his other works are 'The Heart of the Andes'; 'Cotopaxi'; 'Morning on the Cordilleras'; 'Under Niagara'; 'The Icebergs'; and 'Sunrise on Mount Desert Island.' After a visit to the Holy Land in 1868 he

painted 'Damascus' (1869); 'Jerusalem' (1870); 'The Parthenon' (1871).

CHURCH, Frederick Stuart, American artist: b. Grand Rapids, Mich., 1 Dec. 1842. He studied at the National Academy of Design, of which in 1885 he was elected a member. He has achieved note as a realist and is well known as a painter of figures and animals. He has a sentitive and delicate feeling for color which he realizes more fully through his use of water color than in the medium of oil. Among his pictures are 'Weirdness'; 'Mad as March Hares'; and 'The Sea Princess,' in oil; 'Hard Times'; and 'The Phantoms,' in water colors. He exhibited 'St. Cecilia' in 1896 and in the National Academy of Design 1901, 'The Sea Serpent'; 'Companions' (1909); 'The Were Wolf' (1910); 'Summer' (1911); 'The Stowaway' and 'Refuge' (1912); 'Conquered' (1913).

CHURCH, George Earl, American soldier, engineer and explorer: b. New Bedford, Mass., 7 Dec. 1835. He was a member of the Scientific Exploring Expedition in South America in 1858; served in the Army of the Potomac 1862–65; and was war correspondent in Mexico for the New York *Herald* 1866–67. He made explorations in South America 1868–72; was United States commissioner to visit and report on Ecuador 1880; represented American Society of Civil Engineers at London Congress of Hygiene and Demography in 1891, and was president of the Geographical Society of the British Association in 1898. He is now resident in London where he is vice-president of the Royal Geographical Society.

CHURCH, Irving Porter, American civil engineer and educator: b. Ansonia, Conn., 22 July 1851. He was educated at Cornell University and has been professor of applied mechanics and hydraulics in the College of Civil Engineering there, from 1892. He has published 'Statics and Dynamics for Engineering Students' (1886); 'Mechanics of Materials' (1887); 'Hydraulics and Pneumatics' (1890), these three being combined into his 'Mechanics of Engineering' in 1890; 'Notes and Examples in Mechanics' (1892); 'Diagrams of Flow of Water in Open Channels' (1902); 'Hydraulic Motors' (1905); 'Mechanics of Internal Work' (1910).

CHURCH, John Adams, American mining engineer: b. Rochester, N. Y., 5 April 1843; d. New York, 19 Feb. 1917. He was educated in New York city, completing his course in the School of Mines, Columbia University, in 1867. The two years immediately following his graduation were passed in European travel. From 1872 to 1873 he was acting professor of metallurgy and mineralogy at Columbia, at the same time editing the *Engineering and Mining Journal.* Several years later he was appointed a member of the United States Geographical and Geological Survey. Much of his work for the government was done in Nevada. He was assigned to make a detailed study of the Comstock lode, and at the completion of the work startled the scientific world by evolving the theory that the presence of heat at the bottoms of deep mine shafts is due to a chemical action in the rock and not to the approach to the earth's fires. His report received recognition by Columbia University and the degree of doctor of philosophy was conferred on him. From Nevada Mr. Church went to Ohio State University as professor of mining and metallurgy. He entered the employ of the Chinese government in 1886, and for four years under Viceroy Li Hung Chang he supervised the reopening of several famous silver mines in Mongolia. Mr. Church served on the Assay Commission under President Cleveland. He was the author of 'Mining Schools in the United States'; 'Notes on a Metallurgical Journey in Europe' (1875); 'The Comstock Lode' (1880); 'Report on Artesian Wells in Arizona,' and other volumes of a technical character. He was a member of the American Institute of Mining Engineers and of the Century Club.

CHURCH, Richard William, English clergyman: b. Lisbon, 25 April 1815; d. Dover, 9 Dec. 1890. He took a first-class at Oxford in 1836, and soon after was elected to a fellowship at Oriel. From 1852 to 1871 he held the rectory of Whatley, near Frome. In 1871 he became dean of Saint Paul's Cathedral, London. In 1854 he published 'Essays and Reviews,' and thereby took rank almost at once as one of the most graceful and scholarly writers of the day. His university sermons 'Human Life and its Conditions' (1878); 'The Gifts of Civilization' (1880); and 'The Discipline of the Christian Character' (1885), are profound contributions to religious thought. Other works by him are 'Life of Anselm' (1843); 'Dante: an Essay' (1850); 'Spenser' (1879); 'Bacon' (1880); 'The Oxford Movement' (1891); 'Miscellaneous Essays'; 'Occasional Essays.' Consult his 'Life and Letters' (1895).

CHURCH, Samuel Harden, American writer: b. Caldwell County, Mo., 24 Jan. 1858. He is a railway official in Pittsburgh, Pa., and has written 'Oliver Cromwell: a History' (1874); 'John Marmaduke' (1897); 'Corporate History of the Pennsylvania Lines West of Pittsburg' (1898–1900); 'Penruddock of the White Lambs' (1907); 'Short History of Pittsburgh,' 'The American Verdict on the Great War' (1915).

CHURCH, William Conant, American editor and author: b. Rochester, N. Y., 11 Aug. 1836; d. New York city, 23 May 1917. He was educated in the Boston Latin School. While still a youth he engaged with his father in editing and publishing the New York *Chronicle.* In 1860 he became publisher of the New York *Sun* and in 1861–62 was Washington correspondent of the New York *Times.* He resigned this position on his appointment as captain in the United States Volunteers in 1862. He served for one year, receiving brevets of major and lieutenant-colonel. In 1863, with his brother, F. P. Church, he established the *Army and Navy Journal,* and in 1866 founded the *Galaxy Magazine,* and conducted it until 1878 when it was merged in the *Atlantic Monthly.* In 1882 President Arthur appointed him government inspector of the Northern Pacific Railroad. With George W. Wingate he established the National Rifle Association and was its first president. He took a very active part in public affairs in New York city; was one of the founders of the Metropolitan Museum of Art, and a life member and director of the New York Zoölogical Society. He pub-

lished 'Life of John Ericsson' (1890); 'Life of Ulysses S. Grant' (1899).

CHURCH, a word derived from the Greek *kyriakos*, dedicated to the Lord, the Scottish *kirk* and German *kirche* being forms of the same word. In its widest sense the Church denotes the whole community of Christians, and was thus used by the New Testament writers. In more restricted significations it denotes a particular section of the Christian community differing in doctrinal matters from the remainder, as the Catholic Church, the Protestant Church, etc.; or to designate the recognized leading church of a nation or community as the Greek, Lutheran, Gallican, Anglican, Presbyterian, etc., Church. In another sense it signifies the building in which Christians assemble for the worship of God, and, referring the reader to the separate articles on the sects into which the community is divided, this article is confined to a few remarks, historical and descriptive, on *church* as denoting the edifice appropriated to Christian worship. When in the time of Constantine the persecuted Christians emerged from their meeting-places in upper rooms and in the Roman catacombs by favor of the Imperial edict, no buildings could be found fitter for their purposes than the basilicas or royal public halls of Rome. The basilica (q.v.) was generally in the form of a parallelogram, with a semi-circular apse at one end, which was raised, being approached by a semi-circular range of steps. In the centre of this apse was the raised seat of the quæstor or other presiding magistrate; on each side, upon the steps, were places for the assessors, or those engaged on the business being transacted. In front of the apse was placed an altar, where sacrifice was performed before undertaking public business of any importance. The area of the building was divided by two rows of columns, the central division or nave being by far the broadest; over the two smaller divisions or aisles a gallery was often raised. In the small dark and Pagan temple there was neither room nor light enough to conduct Christian worship, but in such a building as above described, the whole congregation of the faithful could meet and take part in the act of worship. The bishop naturally took the place of the quæstor, the priests that of the assessors. The altar (q.v.) on which the pious Pagan poured his libations at the commencement of important business served equally well for the celebration of Christian rites. (See ALTARS). When in course of time the separation between laity and clergy became complete, the apse was railed off and appropriated to the use of the clergy, then the raised part on which the altar stood was separated by pillars called *calcelli*, and not allowed to be profaned by the multitude. Another change was the introduction of a choir, or enclosed space in the centre of the nave, round three sides of which the faithful congregated to hear the gospel read from two pulpits built into its inclosure on either side, or to hear the services read or sung by the minor clergy, who occupied its precincts. As time went on other modifications were introduced; on the erection of new buildings, the symbolic form of the cross was generally adopted as the most suitable for a Christian building; the arms of the cross (the transept) were railed off by rows of columns as the main building had been; at the point of intersection of the transept with the nave a tower was raised, which was at times surmounted by a small spire; frequently two towers were placed at the angles of the entrance end of the edifice. Over the greater part of Europe the style which came to be usually adopted for ecclesiastical buildings was the pointed Gothic, as lending itself more readily to a more majestic and ornamental treatment than the graceful Greek with its columned portico and rounded tower. Circular churches, which were popular at an early date, have found little imitation. The structures which are among the most notable in point of size or historic interest are alluded to in the article on CATHEDRALS. The ordinary churches are generally long rectangular buildings, without transepts, and the tower is placed so as to form the principal entrance, or at one of the angles of that end of the church. During the latter half of the 19th century a taste for a superior style of building to that hitherto prevalent arose among all Christian bodies and resulted in the erection of many fine church edifices throughout the world. (See ARCHITECTURE). Consult Brandon, 'Parish Churches' (London 1848); Braudot, 'Eglises de bourgs et villages' (Paris 1867); Everett, 'Historic Churches of America' (Boston 1884); Norton, 'Church Building in the Middle Ages' (New York 1880).

CHURCH, an Organization of Christians. As understood to-day there are two widely different opinions regarding the meaning of a church, and both claim the New Testament as authority, (1) that Jesus Christ established a definite Church with a code of laws pertaining to belief and government; (2) that he gave us only moral instruction and no definite laws of belief or discipline. Under (1) may be classed those who claim that Jesus Christ established only one Church, and that the churches mentioned by Paul and others of the early missionaries, as recorded in the New Testament, were all parts of the one Church. Still others hold that the Christian Churches of the New Testament were each separate and distinct in government, but one faith. The Roman Catholic, Greek, Church of England and all Christian organizations with any generally recognized form of government, whether by presbyters or by the congregation, may be classed under (1). Under (2) will come all who hold that to observe the moral code as taught by Jesus Christ is all sufficient, hence this division need not be treated under the head Church.

The Roman Catholic definition of Church is: "The congregation of all the faithful, who being baptized, profess the same doctrines, partake of the same sacraments, and are governed by their lawful pastors under one visible head on earth, the Bishop of Rome." This implies unity of faith, morals and government. The Greek definition is the same except they do not recognize as the visible head the bishop of Rome. The Church of England definition is: "A congregation of faithful men, in which the pure word of God is preached, and the sacraments be duly administered in all those things that are of necessity requisite to the same." In the further authorized explanation of this definition it is shown that the government is given to the bishops without any authoritative

head. The same definition is in general use by all other Christian churches, but in some the government is vested in presbyters, elders or officers acting as elders; in others the government rests in the congregation or members of the church. See CHURCH GOVERNMENT.

Under the names of the various Christian denominations may be found further information regarding particular doctrines and forms of government. See CHRISTIAN CHURCH; CHRISTIANITY; CHURCH AND STATE.

CHURCH-ALE, formerly a church festival in England at which ale was drunk liberally; also the ale brewed for such a festival. The name is obviously compounded like bridal—bride-ale, scot-ale, clerk-ale, bid-ale, etc. The church-ales were usually held upon Whitsuntide, and two persons were chosen beforehand to preside over the feast, and divide out the victuals and drink voluntarily contributed by the parishioners. Sometimes the drink which had been brewed from malt given by the parishioners was sold about Whitsunday at the church for the support of orphans and poor, the repair of the church and similar objects. The practice of holding church-ales with the corresponding games was denounced by the Puritans, and is not overlooked in Stubbs' 'Anatomie of Abuses.'

CHURCH CALENDAR. A systematic method of arrangement of the feasts of the Christian Church has long been in use, and the record of the time of these feasts is called the Church Calendar. Many of the feasts of the Church occur on a fixed day of the month, as Christmas, 25 December; All Saints', 1 November; Assumption, 15 August, and the feasts of the saints. The "movable" feasts are regulated from the feast of Easter Sunday. (For Easter see CALENDAR). The fiftieth day after Easter Sunday is "Pentecost"; the eighth day after "Pentecost" "Trinity Sunday," etc. The fasts, except those of Lent, are regulated by the feasts, the records of which are found in the calendar.

CHURCH DISCIPLINE, the practice of the Christian Church in dealing with such of its office-bearers and members as have by public scandal caused hindrance to its common spiritual life. Its Scripture authority, resting on such passages as Matt. xvi, 19; xviii, 15 (et seq.), is further enforced in Paul's epistles and in the gospel and epistles of John. Discipline, in the ecclesiastical sense, means the laws which are intended to govern the subjects of the Church in their conduct, as distinct from dogmas or articles of faith, which affect their belief. These laws may be based upon the Scripture and tradition or they may be the outgrowth of the condition of the times.

CHURCH OF ENGLAND. See ENGLAND, CHURCH OF.

CHURCH FATHERS (*patres ecclesiæ*), teachers and writers of the ancient Church, who flourished after the time of the apostles and apostolic fathers (the immediate disciples of the apostles), from the 2d to the 6th century. This name is also sometimes given to the teachers and writers of the following centuries, down to the schoolmen, who begin with the 12th century. A large number of their writings have been preserved, and have been published by modern scholars. The fathers of the Church are divided into two chief classes—Latin and Greek. The most celebrated among the Greek fathers are Clement of Alexandria, Origen, Eusebius, Athanasius and Chrysostom. The most distinguished among the Latin fathers are Tertullian, Augustine, Ambrose and Jerome.

CHURCH GOVERNMENT. The system by which the affairs of the local church, or congregation, and of the denomination are directed. The main principles of church government are derived by various bodies of Christians from the New Testament. Roman Catholics and Episcopalians, Presbyterians and Reformed, Baptists and Congregationalists, whose polities are as different as possible, all believe that their respective systems of church government are derived from the Scriptures, particularly from the Gospels, the Acts of the Apostles and the Epistles. Apostolic succession is of fundamental importance to the Roman Catholic, the Greek Catholic and the Anglican communion, and the teaching and practice of the Apostolic Church are, therefore, regarded by them as of binding force. Each traces its succession of bishops, and hence of ordained ministers, back through the ages to one or another of the apostles, and holds that since the time of Peter and Paul it has had an unbroken succession of the episcopal order. Churches using the presbyterian or congregational order hold that their respective systems are in harmony with the Scriptures and insist that they have a valid ministry. They do not accept the idea of apostolic succession, and do not believe that any particular system is of divine authority, but that churches of Christ are free to adapt their polities to circumstances and conditions, provided that the procedure be orderly.

There are three more or less distinct systems of polity, or church government, generally recognized, known as the congregational, the presbyterial and the episcopal. There are, however, many modifications or variations of these systems. It is not always possible to determine what particular system a particular denomination employs. The Lutherans in the United States generally classify themselves as congregational; some of them, however, contend that their system is presbyterial, while a few insist that it is really more nearly episcopal. In the Scandinavian countries the Lutheran is the state church and has bishops.

1. The congregational method regards the local church, or congregation, as having full control of its own affairs, and as not subject to legislative or executive direction by any denominational organization or even by the whole denomination itself. That is, each local church is a complete body in itself with inherent authority to conduct all the business appertaining to itself. The principles of fellowship and co-operation, however, come in to modify any tendency toward strict independency of the local church, which feels that it ought to be related to other churches of like faith and order, and recognizes that fellowship is concerned to know, when a new church is organized and seeks the recognition of other neighboring churches of the same name and order, what are its doctrines, principles and practices, and when it calls a pastor, to be

assured of his standing and qualifications. Hence, associations, or conferences, of contiguous churches, and councils for recognition, ordination and installation, and hence, also, cooperation in the support of denominational missionary, educational and other boards, or societies. Congregationalists and Unitarians and the various Baptist bodies, with other denominations, accept the congregational system. Baptists and Congregationalists in the last half century have developed denominational conventions and councils for the supervision of general denominational activities.

2. The presbyterial system is government by presbyters, which is another word for elders. Presbyters (Milton said, "New presbyter is but old priest writ large") are elder ministers, or teaching elders, bishops or pastors, and there are also in each local church "ruling" elders, who are laymen, and with the pastor constitute the session or consistory. Control in each church is exercised through the session or consistory; then comes the presbytery or classis, composed of pastors and elders of the churches of a district; then the synod, consisting of representatives from presbyteries or classes, and then the General Synod or the General Assembly, the chief legislative and judicial authority of the denomination. All Presbyterian and Reformed churches use the presbyterial form of government, and, strictly speaking, that of the Methodists is more akin to the presbyterial than to the episcopal polity, although they have bishops. The Methodist bishop is a general overseer or superintendent, but has no legislative power and is subject, under a few constitutional restrictions, to the legislative, executive and judicial authority of the General Conference, the supreme governing body.

3. The episcopal system centres in the bishop. The Roman Catholic Church is governed by the Pope as bishop of Rome, which it calls the primal Christian see. He creates cardinals, archbishops and bishops, calls ecumenical councils, at long intervals, to advise him, but he is always the supreme head of the Church, "the vice-regent of Christ on earth." The Anglican Communion and the Eastern Orthodox Churches are also episcopally governed, though the state comes in to modify the system somewhat. The Protestant Episcopal Church of the United States has a triennial General Convention, composed of two houses, the house of bishops and the house of clerical and lay deputies, the latter elected by the diocesan conventions. This is the supreme legislative body of the Church. Concurrence of both houses is necessary to the enactment of legislation. The Methodist Episcopal Church, a type of a number of bodies similarly organized, lodges supreme legislative and judicial power in the General Conference, a body composed of ministerial and lay delegates elected by the annual conferences and lay electoral conferences. The bishops preside over its sessions, but are not members of it, and have no part in its proceedings, except as presiding officers. Prior to 1872 this body consisted solely of ministers; since that date laymen have participated in the government of the Church. The patronage of the Church, the appointment of pastors, is vested by the constitution in the bishops.

The denominations provide judicial courts to determine the validity of ecclesiastical legislation and to try ministers and laymen accused of offenses against doctrine, discipline, and morality, according to the polity in use, recognizing the principle generally that ministers should not be condemned except by tribunals constituted of ministers, or of ministers and laymen.

Briefly, the following distinctions are characteristic of the different ecclesiastical polities: In the congregational form, no convention or council has power to legislate for the local churches or to make and enforce rules for their government. The local church is the fountain of ecclesiastical power. In the presbyterial form, the presbytery is the ecclesiastical unit, but with no power of legislation, which rests with the denomination in a representative general synod, or general assembly, consisting of representatives of the presbyteries. In the episcopal system, as represented by the Protestant Episcopal Church, supreme power belongs to the denomination, as in the presbyterial form, but bishops have a co-ordinate power in legislation with clerical and lay deputies of the dioceses, while in the Roman Catholic Church, the bishop holds, in the person of the Pope, all power in his hands.

HENRY K. CARROLL,
Author of 'Religious Forces in the United States.'

CHURCH HISTORY, the history of any church, but especially of the Christian Church. Church history naturally divides itself into four periods: From the advent of Christ to the time of Constantine; from Constantine to Mohammed, or by the arrangement of Mosheim and others, to Charlemagne; from Mohammed, or alternately from Charlemagne to the Reformation; from the Reformation to the present time. This division of the subject is not always followed; some authors regard the great periods in Church history as: Foundation; Persecution; Extension; Reformation. See CHRISTIAN CHURCH, THE.

CHURCH OF THE NEW JERUSALEM, a body of Christians founded on the writings of Emanuel Swedenborg (q.v.), and often called "Swedenborgians." Swedenborg was a public officer of Sweden who became intensely interested in religious matters and, retiring from office in 1747, devoted himself thereafter till his death in 1772, in London, to receiving and writing his revelations, as they are called. From his voluminous works are drawn the system of religion held by the New Church, his followers believing that he was a "divinely illuminated seer and revelator." He never preached a sermon and no societies were formed until after his death. Public services were first held in 1788, in London, and the first church of the order in America was organized in Baltimore, in 1792. The name is taken from the Revelation of John, who beheld the "New Jerusalem coming down from God out of heaven." The doctrines are set forth in Swedenborg's books and briefly formulated in a creed in the 'New Book of Worship.' A distinctive idea is that material things have correspondences in the spiritual world, and that the word of God has an outward and also an inward or spiritual meaning. His views of the Trinity do not contemplate three persons, but distinctions in essence and existence, in love,

wisdom, power. Jesus is directly worshipped as God, in whom is the Father, the Son and the Holy Ghost. Christ is creator and redeemer, the word and the revelation. The Father is the divine inmost, the divine love; the Holy Ghost is the divine proceeding in and for man. Thus the New Church reverses the usual trinitarian view of approach to God through Christ. As to Christ's second coming, Swedenborg held that it occurred when the interior meaning of the Scriptures was revealed to himself in 1757, and that universal judgment accompanied this advent in which the religious beliefs of mankind were overturned and recast. In other words, the New Church means a new dispensation following the apostolic as the apostolic followed the Jewish, and embraces all who acknowledge these three essentials: (1) The divinity of our Lord; (2) the holiness of the Word; (3) the life of love; and unite with the New Church. The ritual is similar to that of the Anglican Church, except that it is all addressed to Christ as God, and not through Christ to another of the Trinity. Two sacraments are observed, baptism, through which angelic association is formed, and the Lord's Supper, in which the Lord is not present materially but really in the divine good and truth, which are his body and blood.

Societies of the New Church exist in England and many other foreign countries. There are two divisions of the body in the United States, one known as the General Convention, the other as the General Church.

1. The General Convention of the New Jerusalem in the United States was organized in 1817 and is composed of delegates from State and Territorial associations. The convention meets annually. There are general pastors who preside at the meetings, and ordained pastors and ministers. Local churches and associations have power to conduct their own affairs; the polity is a modified episcopacy.

2. The General Church of the New Jerusalem originated in the Academy of the New Church which was formed in 1876 for a stricter adherence to Swedenborg's revelations and for the development of the religious and social life of the Church. Twelve principles were enunciated, among which was the declaration that the government of the Church belongs to the priesthood of three degrees, the highest of which is bishop. The General Association of Pennsylvania supported the Academy and, finding itself out of harmony with the General Convention, organized anew in 1897 as the General Church of the New Jerusalem and elected a bishop. The General Church had in 1916 1,272 members, 22 churches and 38 ministers. Its publishing house is at Bryn Athyn, Pa. The General Convention had in the same year 8,500 members, 128 churches and 102 ministers. Its publishing house is at 3 West 39th street, New York. Consult Swedenborg's works; Dole's 'New Church — What? How? Why?' (New York 1906).

HENRY K. CARROLL,
Author of 'Religious Forces in the United States.'

CHURCH-RATE, in England, a rate raised for the purpose of repairing and sustaining the established parish churches, churchyards and other ecclesiastical objects. It was made by the church-wardens with consent of the parishioners, who fixed the amount, but could not refuse it altogether, as in that event the church-wardens were empowered to levy a rate for necessary purposes. Church-rates originated in the quadruple charges laid on the ancient tithes (q.v.), one for the edifices of the Church, and the other three for the support of the bishop, the clergy and the distribution of charity to the poor. The rate, though applicable to the requirements of parish churches only, was imposed upon parishioners of all religious denominations. This gave rise to frequent complaints, and these led to repeated proposals for its commutation or entire abolition. The compulsory imposition of the rate was abolished in 1868.

CHURCH AND STATE. Between these two institutions, in modern times, there has rarely, if ever, existed perfect harmony. This struggle, so long protracted, bids fair, unless some astonishing upheaval occurs, to last for all time. It has been a bitter one. It has involved large interests and brought to the forefront momentous discussions. It has fomented uprisings of all kinds and originated a literature of vituperation without parallel outside of political strife. It has been, not seldom, mere political contention. There has been much confusion of issues, yet the lines of division are visible throughout. The question has its historical side and its doctrinal features. In contemporaneous events it is reduced, practically, to a battle between one important Church and not a few of the civil powers. In Italy the recognition of that Church has reached the irreducible minimum. France has at last snapped the only link which, since the days of the Directory, constituted after all but a semblance of union. Everywhere at present we find ourselves confronted with a state using its power against a Church, or a state Church, or Church and state going their own ways, very little mindful of each other. Summarized, the history of the contest is that before the coming of Christ there was no Church in the sense in which it has been presented by Christianity in its many forms. The religions of antiquity, with the exception of that of the Jews, were for the most part unsystematized beliefs and a ceremonial which was either identified with the state or was a mere function thereof, dependent in a large measure on civil rulers. This is found to be the case in the great religions of the ancient world; the religions of the Egyptians, of the Assyrians and Babylonians, of the Iranians, of the early Sanscritic Indians, of the Phœnicians and Carthaginians, of the Etruscans, and of the ancient Greeks and Romans (Rawlinson). The religion of the Jews, as is sufficiently well known to all educated persons, was the essential element in their theocratic form of government. While this lasted friction was hardly possible. In captivity the Jews, as religionists, were more or less hampered by their conquerors. They were sometimes persecuted, sometimes unmolested. In general, a goodly amount of religious liberty was accorded them. The historic struggle for Church supremacy and independence began with Christianity. It met with opposition from the start. The antagonism germinated the day when Herod, his court and all Jerusalem were troubled, because wise men came from the East and asked where is He that is born King of the Jews. It became more

accentuated when Christ began to teach in public and more intensified when His disciples set out upon their missionary journeys. In the commencement of the 2d century the Roman Empire, which was the whole known world, was agitated, and for 200 years thereafter the Imperial state used all its powerful machinery to crush the Church out of existence. It is to be noted that whenever the state pressed heavily against the Church, the reason put forward was the weal of the state. This has always been the war cry. Under Constantine the Church entered the arena of universal activity as a collaborator in the task of civilizing the peoples. Acknowledged as the spiritual ruler, it gradually acquired a local habitation and a name as a temporal potentate. It became a world power. This success was the beginning of all the many disasters of the Church. Some say this external grandeur was the cause, others that it was merely the occasion, of every calamity by which the Church has been visited. Emperors granted her immunities and promulgated laws in her favor. The wealth and position which she acquired (legitimately or not, according to the spirit of her founder or not, is still a problem for many) was a basis for her of independent action. From the preaching of Christianity at Rome, to the conversion of Constantine, the state persecuted the Church and refused to recognize the divine authority it claimed to possess. From Constantine to Charlemagne the civil power, while giving legal recognition to the Church, interfered in its government. From Charlemagne to a period approaching that of the Reformation, Church and state were closely united and there was a generally acknowledged subordination of the civil to the spiritual authority. During this last division of history the Church was in possession to a very marked degree of the prize which she has lost, though still fights for; that is, she was admitted to have an independent sphere of action, a supremacy in all spiritual matters and an undisputed title to the territory which in one or other way she had acquired and enlarged. She has been accused of greed and tyranny in her management of her temporal rights. In every age many foreswore their allegiance to her. Deserters from her camp counted peasants and princes. These either used or invoked the secular arm against her. The Arians and other dissenters did this. Modern nations were formed and the idea of individual independence became stronger and more general. The Eastern schism was open rebellion against the parent Church. The Orient went its own way through many vicissitudes and much bickering, until it was finally absorbed by the state. In that large portion of Europe there was no longer conflict, for ecclesiastical rule was swallowed up in that state Church which Peter the Great established and which he denominated the Orthodox. Constantinople had drawn Russia into the schism. From 1700 A.D. onward, Peter no longer appointed any one to the office of patriarch, but decreed a directing synod at Saint Petersburg and placed himself at its head (1721). The secession of Martin Luther and his adherents revolutionized the condition of things. His doctrines and his alliances with princes brought about rupture after rupture with the old Church (1530). The followers of Luther discarded all Roman authority whether in temporal or spiritual matters. The Roman Empire gradually split into fragments. Princes introduced the new creed into their respective states. The opposition to Rome grew apace. It ran like a tidal wave over Europe. The British Isles were drawn into the vortex. Henry VIII declared himself head of the English Church. In France Gallicanism propagated a spirit hostile to the Church. Voltaire and the Revolution abolished every vestige of papal authority. A reaction began with Napoleon, who aimed at subordinating the supreme ruler at Rome to himself and to his power. There was a protest on the part of the pontiff. He was thrown into prison. At last a concordat was agreed upon between the consul and himself. Barring the revolutionary changes, the attitude of France has remained the same. The concordat was more or less religiously adhered to until these later times, when the French government violated nearly all its agreements and recently annulled it, thus completely separating state from Church. The Chamber of Deputies passed the bill effecting the separation of Church and state in France. The principles involved in the measure are destructive of all union between the two powers. The state neither recognizes nor salaries any form of worship. The exercise of worship is free under certain restrictions. French citizens, ecclesiastical as well as lay, are not all at one in their views regarding the nullification of the concordat. Some see in it a beginning of better days for religion just as not a few Catholics, the world over, are against any kind of a union anywhere between Church and state and think that the Roman pontiff is much better circumstanced now that he has no temporal rule, for the welfare of the Church and its mission. They hold that the Church won spiritually during the three first centuries — a period when the popes never dreamed of becoming civil sovereigns. Whether or not this view can be considered an orthodox Catholic view may be decided by a reference to recent papal utterances on the matter. It would appear that since the Reformation the only Church which maintains what it considers its prerogative in relation to the state is that of Rome. Practically every other Church is a state one, or claims no rights as against civil government, and as a consequence is ignored by secular constitutions, or is an instrument more or less passive, of the kingdoms or principalities or republics of which it is a territorial part, or is so limited numerically and has so small a voice in general affairs that its demands challenge neither notice, nor censure, nor opposition, on the part of the state. Thus the struggle which for so many centuries shook the world is narrowed down to an antagonism between governments and Rome. The old Roman Church power has dwindled down to a very small area, without kingdom or weapons of defense. Its isolation is complete and absolute. As this Church holds views on the status of Church and state, as she still maintains the principles which for no short period directed national movements, her position demands investigation. What does this Church claim? What is the basis of that claim? To these two questions the Catholic Church has given an answer which goes back very far. The answer is found in all the papal documents in which the popes have touched on this sub-

ject. The reply has been very diligently elaborated by the great doctors and theologians and has introduced into what may be termed, without any implied reproach, Catholic Casuistry, a series of discussions which contain minutiæ of argumentation exceeding the possibilities of this notice to compass. The following condensation will bring forward the very large outlines only. Civil power as well as ecclesiastical authority are of divine origin. Both aim at the welfare of humanity, the one in a higher, the other in an inferior, degree. As both agencies are necessary for the betterment of the race, there must be union and not separation. Not only is union demanded by the nature of the common purpose, but subordination also, and in that subordination the place of supremacy must be ceded to the Church. Each power is distinct, yet each is to help the other. The duty of the state is to protect all the rights of every man, to provide for all a quiet and regulated existence, and, where necessary, to co-operate with the Church, whose divine character it is bound to recognize in the leading of all men to salvation. The Church has the right to require from the secular ruler, as from the individual Catholic, that he should receive from her hands the divine law and act in conformity with her interpretation of its precepts. The Church strengthens civil authority by imposing upon all her subjects that state power is of divine right, that secular governors are the anointed of the Lord. According to this view, in many ages the Pope was looked upon as the head of the immense Christian family scattered throughout the earth. He cited before his tribunal both sovereigns and subjects, composed quarrels, inflicted spiritual penalties upon scandalous princes and deprived of their dignities and rights those who refused obstinately to change their line of conduct. The Pope was then regarded as the natural head and father of Christendom. Kings stood in need of the Church for things religious and the Church was protected by the laws of the state. If the warning voice of the Church failed to deter the evil-doer, the sword of the civil power was drawn in her behalf. The Church asserts her right, in virtue of her divine commission, to require of every one submission to her doctrine. "Each power remains sovereign in its own sphere, each is confined within limits perfectly defined and traced in conformity with its nature and special purpose. There is therefore a circumscribed sphere within which each of them exercises its own action, *jure proprio*, through its own right. Yet, as their authority is wielded over the same subject, it may happen that one and the same thing, though from a different cause, may be under the judgment and jurisdiction of both powers." This position the Church bases on the fact that to Saint Peter, according to her view of Scripture and tradition, and to his successors, Jesus Christ confided the government of His Church; secondly, on the more exalted nature of her appointed end; thirdly, on the conduct of Christ and the apostles who never asked leave from civil rulers to evangelize and whose principle (Acts v) was: "We ought to obey God rather than man." The Church declares that she proclaims the independence of secular power and she herself cannot interfere so long as state action does not infringe upon the laws of God and the rights of the Church and the spiritual interests and chief end of man are not endangered by legislation. In case of conflict, that is to say, when in mixed questions the two authorities impose upon their subjects who are the same persons contradictory obligations, the state should yield to the Church. The foregoing are the principles affirmed by the Church and are the Catholic view of the relations which should exist between both. This doctrine is her doctrine to-day. A stand so peremptory and so unmistakable has not met with universal approval. Within the last 300 years it has been denied *in toto*. The opponents say the foundation on Scripture and tradition is insecure, that such a relation as Rome calls for is inadmissible, because the history of the past proves that it was always controverted in theory and practice, that it led to the denationalizing of peoples, that it incited to the worst of crimes, that it extinguished every spark of patriotism, that it called for the universal empire of the Church, that it spoke for greed and tyranny and self-aggrandizement merely, that it crushed intelligence and battered down all the props of individual and collective freedom, that it fettered thought and clipped the wings of science, that it deflected nations on their march toward progress and that it was a benighted doctrine and to be fought and execrated wherever it showed its head. Statesmen have scoffed at it and expelled its votaries as they would drive out anarchists and criminals. Laws in the most enlightened countries have been made to prevent, if not its existence, at least its logical effects. The widespread theory held by the powers to-day is either: no Church or absorption of Church by state or the subserviency of the Church to the state. It has assuredly gone hard with the Church in many ages and under many governments. No one upholding Christian doctrines could be a citizen has been the expressed opinion of multitudes of people in many countries. The Catholic teaching on this point has angered governments because of two special questions, that of education and that of divorce. In recent times the Church has not been silent regarding the family and her protests have irritated many, while it has also been confirmed by the approval of men outside her pale. As the Pope is now an isolated individual, stripped of all temporal power, the question of Church and state has become purely academic. It must not be lost sight of that, though no civil ruler, his spiritual legislation extends over some 250,000,000 subjects, who are more or less obedient to his commands, and that therefore the states not only now but as long as the papacy lasts will have to reckon with his influence and cannot afford to consider him as at any time a negligible quantity, and hence the question of Church and state is one which, concerning essential features, is not yet to be considered beyond discussion or likely to be closed. See FRANCE.

Bibliography.— Hooker, 'Ecclesiastical Polity'; Balmes, 'European Civilization'; Hallam, 'Middle Ages'; Gladstone, 'Essays'; Macaulay, 'History of England'; Taparelli, 'Diritto Naturale'; Philipps, 'Kirchenrecht'; papal encyclicals. This question is treated in nearly all dogmatic theologies of any note, and they are many, as well as in ecclesiastical histories.

PATRICK A. HALPIN,
Professor of Ethics, New Rochelle College.

CHURCH AND STATE IN THE UNITED STATES. That an indispensable function of any government is the conservation of public morals, and that an indispensable method of achieving it is to enforce the public exercise of some religious forms, seemed axiomatic to most people in the 17th century. The tenet that religion is best promoted by leaving it to individual discretion was first evolved, naturally, by groups whose best hope was immunity, not establishment. These differing circumstances in the English colonies, with change of views from experience and change of policy from gain or loss of power, resulted in four chief attitudes of the colonial governments toward religion: (1) The establishment of a specific Church, and the taxation of the entire community to support it; (2) restriction of suffrage to church members, without specifying the church — "theocracy"; (3) requirement of some church form and steady parish service in communities, without establishment of a specific Church or disfranchising individuals; (4) entire religious liberty.

The first type is found in the chief Southern colonies and New England. Virginia came first, then Carolina before its division, the "Fundamental Constitutions" (see CAROLINA, ORIGINAL CONSTITUTION OF) merely shaping in this respect the provisions of Charles II's charter; lastly Maryland in 1691, after overthrowing the tolerant proprietary government. Each, from the nature of the case, established the Church of England. In New England the form of establishment was peculiar and quasi-casual; it was not statutory nor specific, but rested on local taxation to support a Church which, owing to circumstances, was at first always the Calvinistic Congregational Church. When other church bodies began to grow, this taxation was remitted to all who supported a church of their own; those who were not thus bona-fide contributing members to another Church paid their cess to the Congregational as before. The second type is represented exclusively by the early Massachusetts Bay and New Haven colonies. The former, 18 May 1631, when as yet there was no popular representation in the colony, enacted "that no man should be admitted to this body politic but such as are members of some of the churches within the limits of the same." This restricted suffrage to one-fourth the adult males and was repealed 3 Aug. 1664. The latter, 4 June 1639, agreed "that church members only shall be free burgesses, and they only shall choose among themselves magistrates and officers" for public business. This, of course, perished with the absorption of the New Haven into the Connecticut colony, in 1662. The third type has but one representative, New York, including the Jerseys. This was "the Duke's" (afterward James II) constitution, and is not the only ground for a less harsh judgment on him than prevails. The fourth type includes Rhode Island, the product of a quarrel with Massachusetts theology and politics, in which the founder's views developed by force of circumstances as he went on; Maryland, founded by a Roman Catholic who would not have been allowed to establish his own religion; Pennsylvania, equally limited to seeking immunity from persecution; and Georgia, founded late by an enlightened philanthropist.

The Revolution swept away all vestiges of establishment. The Constitution of 1787 provided against a danger not likely to recur. Article VI enacts: "No religious test shall ever be required as a qualification to any office or public trust under the United States." This, however, did not touch the real likelihood if bigoted sectarians should control the government; the State conventions held to ratify the Constitution, urged a clause to guarantee full religious liberty; therefore the First Amendment begins: "Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof." Even this does not in the least debar individual States from doing it; but most of their constitutions decisively prevent that, not only by direct prohibition, but by enacting that no appropriation of public money shall be made to sectarian institutions. The stability of this provision, the impossibility of evading it, and its incalculable public value, have been proved many times over in the past half century. In the early years of the Union, efforts were occasionally made to have the legislatures enact some test to confine the government to Christians, for fear of atheistic or of Jewish control; or to Protestants, in fear of Catholic supremacy; but the improbability of its need has prevented any approach to success. The only serious problem that has arisen on this point is due to Mormonism, where the claim to free exercise of their religion and its dictates is complicated by one of its ostensible revelations enjoining polygamy. In 1882 Congress prohibited polygamy under severe penalties; and the Supreme Court held this not in conflict with the constitutional provision above cited.

CHURCH STATES. The former dominions of the Popes or Roman Pontiffs in Italy. Prior to 1859, the Papal states covered a territory stretching across Mid-Italy from sea to sea and comprised an area of 17,218 square miles, with a population of 3,124,668. The states originated with the grant of Pepin, king of the Franks, in 754, who bestowed on Pope Stephen II some districts which the Lombards, against whom Stephen II solicited Pepin's assistance, had taken from the Exarchate of Ravenna. Charlemagne confirmed this grant in 774, and in return received the title of Roman Emperor from Leo III in 800. The wise policy of the Popes in conferring favors on the Normans in Lower Italy secured to them in these vassals staunch protectors of the holy see. The structure of the papal power was fully completed in 1075 under Gregory VII. The dominions of Matilda of Tuscany were added to the states of the Church by her request, and the Popes maintained possession of them against all the claims of the German emperors. The papacy removed a dangerous neighbor belonging to the house of Hohenstaufen by raising the house of Anjou to the throne of Naples in the year 1265. The frequent revolutions of the Romans and the influence of the French led the Popes of the 14th century to transfer their residence, from 1305 till 1376, to Avignon, which Clement VI bought of Joanna, queen of Naples and Countess of Provence, in 1348. As this change of residence was made, it was charged under the influence of the king of France, it never obtained the full assent of the

Romans and Germans, and anti-popes were sometimes elected by the opposing factions, and the welfare of the Church as well as of the state suffered by their mutual hostilities. After 20 years of exile the Popes returned to Rome. Julius II added Bologna to the papal dominions in 1513 and Ancona in 1532. The Venetians were obliged to restore Ravenna. Ferrara was also recovered from Modena in 1598, and Urbino was bequeathed to the papal chair in 1626 by its last duke, Francis Maria, of the house of Rovera. The wise administration of Sextus V restored internal order toward the end of the 16th century; but the extravagance and family partialities of some of his successors created fresh disorder. Subsequently Naples renounced her feudal obligations to the papal chair. After the successes of the French in Italy the Pope was forced at the Peace of Tolentino, 13 Feb. 1797, to cede Avignon to France, and Romagna, Bologna and Ferrara to the Cisalpine republic. An insurrection in Rome against the French, 28 Dec. 1797, caused the annexation of the states of the Church to the Roman republic. Pius VI died in France. The victories of the Russians and Austrians in Italy favored the election of Pope Pius VII, 14 March 1800, who, under the protection of Austrian troops, took possession of Rome. By the concordat concluded in 1801 with the First Consul of the French republic the Pope again lost a great part of his temporal dominions. In 1807 France again declared war, and the provinces of Ancona, Urbino, Macerata and Camerino were added to the kingdom of Italy. The possessions of the Church beyond the Apennines were all that remained to the Pope. On 2 Feb. 1808, a French corps of 8,000 men entered Rome; the remainder of the papal states were added to France, and a pension of 2,000,000 francs settled on the Pope, whose ecclesiastical power was guaranteed by Napoleon. The decree of 17 May 1809 put an end for the time being to the ecclesiastical state. The Pope was held a prisoner in France until the events of 1814 again permitted him to take possession of his states. Pius VII was succeeded by Leo XII, who reigned from 1823 till 1829. He was succeeded by Pius VIII, who, in his turn, was succeeded by Pius IX in 1846. The first acts of this Pope were characterized by such a liberal spirit that diplomatic Europe was surprised. The events of 1848 caused the Pope to pause in his advanced policy, which so dissatisfied the extreme liberal party that they drove Pius IX from Rome, and the reins of government fell into the hands of Garibaldi, Mazzini and Avezzano (1849). Some few months afterward the French government, resolving to restore the papal authority, sent General Oudinot with an army against Rome. Defeated in their first attack on the city, the French began a siege in regular form, and in a month's time were masters of it. Pope Pius did not return to Rome, however, until the following year.

After the Austro-Italian War of 1859 the papal see was stripped of the greatest part of its territorial possessions. Embracing before that date an area of 17,218 square miles, with 3,124,668 inhabitants, the Roman territory was then reduced to 4,891 square miles, and 692,106 inhabitants. Of the former legations and delegations into which it was subdivided only five remained, namely — Rome and the Comarca, Viterbo, Civita Vecchia, Velletri and Frosinone. From 1860 to 1866 the papal government was sustained by the presence of a French army, which was withdrawn in 1866 upon the king of Italy binding himself by treaty to respect the integrity of the Roman states. In 1867, however, revolutionists numbering 15,000, belonging to the Italian party of action, entered the papal territory, headed by Menotti Garibaldi. They made but little progress until the elder Garibaldi placed himself at their head. Napoleon III, at the earnest prayer of the Pope, sent an army to protect the city against the violence of the revolutionists, who had now surrounded it. On 28 October the French entered Rome, and Garibaldi, beginning to perceive that he would be hemmed in by the regular Italian forces under Cialdini, thought of retreating. An advanced section of the papal troops came in contact with the Garibaldians (3 November), and were likely to have suffered severely had not two French battalions, armed with the Chassepot rifle, come speedily to their aid. Garibaldi, with 4,000 men, retreated into the Italian territory, where they were disarmed. A strong force of French troops were left in occupation of Civita Vecchia after peace was restored and the Pope seemed as secure as ever. But the outbreak of the Franco-German War changed the aspect of affairs. The French army of occupation left Rome on 30 July 1870, and the Pope was at the mercy of his powerful neighbor, Victor Emmanuel, king of Italy, who, seizing the opportunity, marched upon Rome and took it by force of arms. In September the Italian troops occupied Rome. In October the states of the Church were incorporated with the kingdom of Italy, a plebiscite was held under bayonet-rule, the count of which resulted in 133,681 in favor of the Sardinian occupation and 1,807 against it. In the beginning of July 1871, Rome became the seat of the Italian government and the residence of the court. An Italian law of 13 May 1871 guaranteed, besides possession of the Vatican and Lateran palaces and the villa of Castel Gandolfo, an annual income to His Holiness the Pope and his successors forever of $645,000. This allowance whose arrears without interest in 1918 amounted to $30,960,000 remains unclaimed and unpaid.

CHURCH TEMPERANCE SOCIETY, a national organization of the Anglican Church in the United States. It was founded in New York in the year 1881, and its object is to promote temperance by means of high license. It seeks to influence state legislators and municipal authorities, and it has done most effective work in providing substitutes for the saloon. The organization in the United States follows, in a measure, the methods used by the Church of England Temperance Society.

CHURCH-WARDEN, one of two Episcopalian parochial officers chosen annually at the Easter vestries. In Anglican churches in the United States the wardens are usually elected by the parishes; in England the custom prevails of the rector appointing one warden and the parish the other. Their duties are to protect the building of the church and its appurtenances, to superintend the ceremonies of divine worship and the proper distribution of

alms, etc.; to form and execute parochial regulations and generally to act as the legal representatives of the parish. They usually attend to the secular affairs of the parish. The term "church-warden" is also given to a long-stemmed clay tobacco-pipe formerly much used in Great Britain. A famous "make" of this class of pipes is located in the town of Broseley, in Shropshire.

CHURCHES OF GOD, a denomination of Baptist principles and Methodist organization, founded by Elder John Winebrenner in Pennsylvania, in 1830. Winebrenner was a minister of the German Reformed Church and was active in revival movements and changed his views so as to be out of harmony with his Church, with which his relations were severed in 1828. Continuing his revival work, he organized the fruits in societies, called simply Church of God, which in 1830 were formed into a denomination at Harrisburg, with the same name. The Church of God has annual conferences, called elderships, and a general conference, called general eldership. Since 1860 the denominational name has been Churches of God in North America. The doctrinal position of the denomination is evangelical, with a leaning toward Arminianism, rather than Calvinism. There is no written creed, the Bible being accepted as the only rule of faith and practice; biblical designations are used wherever possible, as in the denominational title. Three ordinances are recognized — baptism by immersion, the Lord's Supper and foot-washing. In each local church there are deacons and elders, who, with the pastor, constitute the church council. Annual elderships, or conferences, are composed of pastors and laymen, and the general eldership of ministers and laymen elected by the annual elderships. It meets once in four years. The Churches of God, including many of German origin or descent, are active in Sunday-school, missionary, educational and young peoples' work. According to denominational statistics for 1916 there are upward of 28,000 members, with 434 ministers and 484 churches. Since 1906 there has been a falling off in the number of churches and ministers and an increase of about 4,000 members. The Church is strongest in the States of Pennsylvania, Ohio, Illinois and Indiana. It has a publishing house at Harrisburg, Pa., where its weekly organ, *The Church Advocate*, is issued. Consult Winebrenner's 'Brief Views of the Church of God' (1840).

CHURCHES OF THE LIVING GOD, the general name applied to three small bodies of colored Christians. The first, called also Christian Workers for Friendship, was begun in 1899, by Rev. William Christian, in Arkansas. It combines with the Baptist faith the Methodist form of organization. Believers are baptized by immersion, the ceremony of feet-washing is observed and the Lord's Supper is celebrated with water and unleavened bread. The churches are generally called temples. The polity is presbyterial, legislative power being lodged in a general assembly, the presiding officer of which is called "chief" or "bishop." The second branch, the Apostolic Church, differs only in calling its chief officer president, instead of chief or bishop. The third branch, the Church of Christ in God, separated from the older body partly for personal reasons and partly to lay more stress on education. The three bodies have together 68 churches, or temples, with 4,276 members, of whom 2,676 are in the first branch, 732 in the second and 848 in the third. There are 81 ministers in all.

CHURCHILL, Charles, English satirical poet: b. Westminster, February 1731; d. Boulogne, France, 4 Nov. 1764. He took orders in the Established Church, but reflected very little credit upon his clerical profession. He won his fame with 'The Rosciad,' a satire upon the actors of the time, in which only Garrick and some few popular actresses are praised. His capacity for ridicule was so great that 'The Ghost,' 'The Farewell,' 'The Conference,' 'The Author' and 'The Prophecy of Famine' proved exceedingly popular.

CHURCHILL, Randolph Henry Spencer, Lord, English statesman, 3d son of the 7th Duke of Marlborough: b. 13 Feb. 1849; d. London, 24 Jan. 1895. He was educated at Merton College, Oxford, and entered Parliament in 1874 as member for Woodstock. After the Conservative débâcle in 1880, he formed what was half satirically known as the Fourth party, consisting usually of four members, who took up an attitude of uncompromising and even obstructive opposition to the measures of government, and one also of frank and brutal criticism of the "old gang," as Lord Randolph called the official opposition leaders. So well did he employ his powers of ready and extensive criticism, both in the House and in the country, that on the accession of the Conservatives to office in 1885 he became Secretary for India. His tenure of this office was rendered notable by the annexation of Upper Burma. On the defeat of Gladstone's Home Rule bill in 1886 and the return of the Unionist party to power Churchill became leader of the House of Commons and Chancellor of the Exchequer. In his leadership of the House he showed tact, judgment and resource; but on 23 December of the same year, owing to demands made by the ministers responsible for the army and navy for increased outlays, to which he was opposed, he caused a sensation by unexpectedly resigning office. Subsequent events showed this to be an act of political suicide, for he never regained his old place in the party councils. A man of great natural abilities, and of boundless ambition, with marvelous political insight and debating and oratorical talent of a high order, he had at the same time the defects inseparable from an unstable nervous system. He married in 1874 Jennie Jerome, a daughter of Leonard Jerome, of New York. In July 1900 Lady Randolph Churchill married George Cornwallis West. His elder son, Winston Leonard Spencer Churchill (q.v.), has inherited his father's political abilities.

CHURCHILL, William, American philologist: b. Brooklyn, 5 Oct. 1859. He was graduated at Yale in 1882 and 1896 was made consul-general to Samoa, also judge of the Consular Court and receiver and custodian of the revenues of Samoa. In 1897 he was also made consul-general to Tonga. In 1902–15 he was a member of the editorial staff of the New York *Sun*. He edited the Malayo-Poly-

nesian department of the 'Standard Dictionary' in 1912. He is a fellow of the Royal Anthropological Institute and of the American Philological Association. He has written 'A Princess of Fiji' (1892); 'Polynesian Wanderings' (1910); 'Beach-la-Mar' (1911); 'Easter Island, Rapanui Speech and the Peopling of Southeast Polynesia' (1912); 'The Subanu' with John Park Finley (1913) and many monographs on ethnological and philological topics.

CHURCHILL, Winston, American novelist: b. Saint Louis, Mo., 10 Sept. 1871. He was educated in the public schools of Saint Louis and at the United States Naval Academy, Annapolis. He was graduated from the latter institution in 1894. He received the honorary degree of A.M. from the academy in 1903. He was a member of the New Hampshire legislature, 1903–05, and was a candidate on the Progressive ticket for governor of New Hampshire in 1912, but failed of election. He has written several successful novels and many articles of interest for the magazines. His novels are 'The Celebrity' (1898); 'Richard Carvel' (1899); 'The Crisis' (1901); 'The Crossing' (1904); 'Coniston' (1906); 'Mr. Crewe's Career' (1908); 'A Modern Chronicle' (1910); 'The Inside of the Cup' (1913); 'A Far Country' (1915); and 'The Dwelling Place of Light' (1917). As an historical novelist and as a novelist of contemporary life he has done substantial work. He writes carefully and the structure of his novels are evidence of this commendable characteristic, which distinguishes him from many gifted popular writers whose methods are more perfunctory.

CHURCHILL, Winston Leonard Spencer, English statesman, soldier and author: b. 30 Nov. 1874, the elder son of the late Lord Randolph Churchill (3d son of the 7th Duke of Marlborough) and Jennie, daughter of Leonard Jerome, banker, of New York. He was educated at Harrow and Sandhurst Military College, joined the 4th Hussars in 1895, and in the same year (while on leave) he saw his first active service — with the Spaniards in Cuba. With the 31st Punjab Infantry he accompanied the Malakand Field Force on the Northwest Frontier of India in 1897, and in 1898 served with the Tirah Expeditionary Force under General Lockhart. When Kitchener started on the reconquest of the Egyptian Sudan in 1898, Churchill immediately joined the 21st Lancers and took part in the battle of Omdurman (Khartum). By the time he was 24 he had already been "mentioned in dispatches" and earned four military decorations. In 1899 he turned to politics and contested the Oldham division as a conservative. He failed, however, and when the Boer War (1899–1902) broke out he was appointed lieutenant in the South African Light Horse, at the same time acting as war correspondent for the London *Morning Post*. On 15 Nov. 1899, during the Natal campaign, he was riding in an armored train with some Dublin Fusiliers and Durban Light Infantry, when they ran into an ambush and part of the train was derailed. Churchill led a little party of volunteers to clear the line in front of the engine, which they succeeded in disentangling from the wreckage. Being still on the rails, it was sent on with its cab full of wounded, shells and bullets playing furiously around them. Churchill got away with the engine, but returned to share the fate of his comrades. All the survivors were captured by the Boers and taken to Pretoria, whence Churchill and Captain Haldane escaped a month later, the former afterward taking part in some 20 battles and engagements. He returned to England in 1900, again contested Oldham in the general election, and this time successfully. He held the seat till the resignation of the Balfour Ministry in December 1905, when he turned over to the Liberal party, which then came into power with an overwhelming majority. The main ground for Churchill's defection was his uncompromising opposition to the Tariff Reform movement inaugurated by Chamberlain in 1903. Elected for Northwest Manchester, Churchill entered the Campbell-Bannerman ministry as Under-Secretary of State for the Colonies. During his first six years in Parliament he had frequently distinguished himself as a skilful debater and a brilliant — if somewhat reckless and impetuous — orator. In 1908 he was raised to Cabinet rank as President of the Board of Trade, a change which necessitated an appeal to his constituency. To the general surprise he was defeated, and had to seek election elsewhere. He was then elected for Dundee, which he still represents (1918). In 1910 he became Home Secretary, the most powerful official in England. During his 21 months' tenure at the Home Office Mr. Churchill frequently encountered adverse criticism levelled against his rather novel procedure in criminal affairs. He not only freely exercised the prerogative of his office in reducing sentences and issuing pardons, but endeavored to ameliorate the rigor of prison life by permitting occasional concerts and lectures to be held in penal establishments. The notorious "battle of Sidney Street," where some foreign criminals were besieged in a London slum on 3 Jan. 1911 by artillery and police under the personal supervision of the Home Secretary, led to a series of attacks in the press and Parliament upon Mr. Churchill for alleged interference. He proved, however, that he had not sent for the troops nor exceeded his authority. In October 1911 Mr. Churchill succeeded Mr. McKenna as First Lord of the Admiralty, in which capacity he was destined to play an important part in the Great War. He kept the fleet in a high stage of efficiency notwithstanding the repeated offers to Germany for a "naval holiday," and was able to assemble, in July 1914, a formidable armada of 200 fighting ships, drawn up in eight lines, extending over 22 miles, and manned by 70,000 men. The occasion of this gathering was the annual royal review off Spithead, which in that year proved of unforeseen value, due to the wise foresight of Mr. Churchill and the then First Sea Lord, Prince Louis of Battenberg. The review ended on 20 July, three days before the Austrian ultimatum was launched. In normal times the vessels would have been dispersed to their respective stations and the reserves called out for the occasion would have been sent home. It has since become known that Mr. Churchill, entirely on his own responsibility, kept the fighting units together and at the critical moment Great Britain's naval strength stood concentrated in the North Sea, ready for action.

After four years' absence from the Admiralty, Lord Fisher, the creator of the dreadnaught, returned as First Sea Lord early in the war. When the Belgians were thrown back on Antwerp and the fall of the city seemed imminent, Mr. Churchill arrived on the scene (4 Oct. 1914) with 2,000 Royal Marines, followed next day by 6,000 more, in a desperate effort to save the city. Antwerp fell on the 10th, and Mr. Churchill did not escape criticism in consequence, though his justifiable attempt delayed the fall of the city for a few days. In May 1915 a Cabinet crisis arose through a quarrel between Mr. Churchill and Lord Fisher over the Dardanelles campaign. The first phase of the operations in that theatre had ended in disaster on 18 March. Lord Fisher resigned; Mr. Asquith reconstructed his Cabinet and Mr. Balfour succeeded Mr. Churchill as First Lord, the latter accepting the undistinguished office of chancellor of the duchy of Lancaster. Lord Fisher refused to reconsider his resignation unless Mr. Churchill were eliminated, and as that condition was not fulfilled, he disappeared. On 11 Nov. 1915 Mr. Churchill resigned his office and on the 15th he reviewed in Parliament the share he had taken in the matter of Coronel, Antwerp and the Dardanelles, asserting that Lord Fisher had never expressed disapproval at the War Council. Two days later Mr. Churchill left for the front with the rank of major in the Grenadier Guards. In December 1916, on the accession of Mr. Lloyd George to the premiership, Mr. Churchill succeeded him as Minister of Munitions. The Report of the Dardanelles Commission (March 1917) revealed that he originally conceived the idea of the campaign as a means of defending Egypt. Among his numerous literary activities the chief are 'Lord Randolph Churchill' (2 vols., 1905); 'The River War' (the Sudan campaign, 1899); 'The Story of the Malakand Field Force' (1898); 'London to Ladysmith *via* Pretoria' (1900); 'Ian Hamilton's March' (1900); 'Savrola' (a novel, 1900). See WAR, EUROPEAN.

HENRI F. KLEIN,
Editorial Staff of The Americana.

CHURCHILL RIVER, a river of the Northwestern Territories of Canada, which arises in La Grosse Lake, forms or passes through various lakes or lake-like expansions, the largest being Big or Indian Lake, and enters Hudson Bay near Fort Churchill, after a northeasterly course of about 800 miles. It is called also Missinnippi, English and Beaver. Except by means of frequent portage, it is not navigable.

CHURCHING OF WOMEN, a rite founded on the Mosaic injunction found in Levit. xii, 6–8, and as practised in some denominations, is now a giving of thanks for the birth of a child. The first mention of the subject as a usage in the Christian Church is found in the pseudo-Nicene Arabic Canon, but no prescribed form is given.

CHURL (Saxon *ceorl*) in modern usage, a rude, boorish person, but in Saxon England, the term denoted a common freeman. The rank of the churl, or ceorl, steadily declined until finally the only important distinction between churl and serf was that the former might choose his own master. The better class of churls sometimes found their way into the class of theyns, or thanes, corresponding to the knights of post-Conquest times, while the others became the villeins of the Norman feudal organization. 'Domesday Book' makes no mention of the word ceorl.

CHURN, a vessel in which cream is agitated to separate its buttery globules in a solid mass from the fluid portions. The length of time usually occupied by this process, and the fatigue consequent upon working those machines by hand, have caused the ingenious to produce numerous modifications in form and size. Some may be worked by dogs in the way a squirrel-wheel is driven; others may be worked by horse power; and in some cases steam is the motive power. The ordinary plunge-churn, with its cylindrical box, its straight rod projecting downward through the cover and attached below to the dasher, has been greatly improved by an arrangement by which the air is introduced into the cylinder at every stroke by a tube run right along the handle, with a valve at its end which opens as the dasher rises and closes as it sinks. The air is thus dashed through the cream, separating it into innumerable small particles, and throwing it into a state of foam. A box form of churn, with dashers attached to a rod passing horizontally through the box, and driven by a winch, is frequently used. Less common kinds are those in which the whole body of the machine is set in motion, such as the rocking-churn and the barrel-churn. A churn on the centrifugal principle has been introduced into Sweden. Though the rapid completion of the process of butter-making is the principal end in view, it is a well-known fact that butter suffers seriously by too rapid a process. When butter forms in about 45 minutes it is sure to be good; when it appears sooner it is soft; when later, strong-tasted. See BUTTER; DAIRY.

CHURRIGUERESQUE, chûr'ri-ga-rĕsk', the term used to describe that distinctively Spanish post-Renaissance style in architecture which corresponds to the combined Barocco and Rococo. It takes its name from José Churriguera who was "royal architect" in the reign of Carlos II and through his two sons and his pupils, the Quinones, dominated Spanish architecture in the first half of the 18th century. Its most striking and unrestrained development was in Mexico. See MEXICO — ARCHITECTURE.

CHURRUS, chûr'rŭs, the resinous exudation of the leaves and flowers of Indian hemp, *Cannabis indica.* It is used by the natives of India as an intoxicating drug. According to Jaffur Shurreeff, a man covers himself with a blanket and runs through a field of hemp early in the morning; the dew and gum of the plant naturally adhering to it are first scraped off and the blanket afterward washed and wrung. Both products are boiled together and an electuary formed. The smoking of five grains of it will produce intoxication.

CHURUBUSCO, choo-roo-boos'kō, **Battle of,** one of the principal engagements of the Mexican War, took place 20 Aug. 1847. Contreras (q.v.) was won in the early morning, Churubusco in the forenoon and early after-

noon, of that day, but they are quite distinct battles. The main road north to the City of Mexico, via San Augustin and San Antonio, an elevated paved causeway, converges with that on the west from Contreras and Coyoacan at Churubusco, a village six miles south of the capital and a mile northeast of Coyoacan. Just north of it runs east and west the little stream called Rio Churubusco, crossed by the main road at a bridge fortified with a bridge-head; there was a strong bastion 75 to 100 yards on a side, with embrasures sweeping the San Antonio road. Along the sides were cornfields, maguey plantations, hedges and thickets, and irrigating ditches full of water. In the western part of the village, southwest of the bridge-head, on the Coyoacan road, was the Convent of San Pablo, a massive building with walls so thick that field-pieces could make no impression on them, defended on two sides by strongly built bastions with six or eight heavy guns, and the building itself an impregnable cover for musket-fire. Around it was a flooded moat, in front were cornfields and thickets. The two points to be carried were the convent and the bridge-head; and since, after the rout at Contreras, this was the last place where the Mexicans could make a stand short of the City of Mexico, the resistance was likely to be desperate. The wreckage of Contreras was being pursued by Pillow and Twiggs along the Coyoacan road; and Worth, having turned the works at San Antonio on the main road, had captured a considerable body of the enemy, and was advancing along the causeway. Santa Anna threw a battalion into the convent, placed five guns and a heavy body of troops at the bridge-head, and posted several regiments along the north bank of the stream. The first assault was made on the convent. Bennet Riley's and Persifor F. Smith's brigades, Dimick's and Taylor's batteries, attacking it from the west and south, were received with a storm of shot and shell from the guns in embrasures and barbette; and as they struggled out of the cover they were swept by the musket-fire from the building itself, with heavy loss. Seizing a line of adobe buildings 60 yards from the convent, they opened fire under that protection and held it till the time for advance. Meantime Worth's division, with Pillow, Cadwalader, Garland, Clarke and others, had charged down the causeway, blocked for several hundred yards with loaded wagons, and through the fields to the bridge-head. Broken into irregular fragments by the hedges and ditches, they were twice repulsed with tremendous loss by the plunging fire of the Mexican guns; but Shields had moved north from Coyoacan and, after a fierce combat, which nearly overwhelmed him, he was reinforced by Lee and Sumner, carried the river line, and moved east against the rear of the bridge. In danger of having their retreat from the capital cut off, the Mexicans lost nerve, and a third charge from the Americans carried the head with a rush. Thence they turned southwest against the convent; the American artillery was still battering it on the other side; a sally from the garrison was driven back and, as the fire slackened, both divisions of the Americans entered it from opposite sides at the same time. The American forces in this battle numbered a little over 7,300; the Mexican numbers are uncertain, but probably about 25,000. The American losses at Contreras and Churubusco together were 1,053, not over 100 at Contreras. The Mexican loss was 2,637 prisoners at both, and probably 2,000 at least killed and wounded at Churubusco. Consult Bancroft, H. H., 'History of Mexico' (1885); Scott, General, 'Autobiography' (New York 1864); Wilcox, 'History of the Mexican War' (1892).

CHUSAN, ARCHIPELAGO, choo'sän, a group of islands off the east coast of China, the largest being the island of the same name, which is about 21 miles long, and from 6 to 11 broad, with a population of about 200,000. Its surface is finely diversified by hill and dale. The rocks are evidently volcanic; and the soil, often very fertile, is under good cultivation, for the most part by spade husbandry. On the same slope may be seen, in different stages of their growth, wheat, tea, sweet potatoes, cotton and tobacco. There are several towns on the island; the capital is Ting-hae, a walled town of about two miles in circumference. From its situation near the mouths of the Yang-tse-kiang, which forms the great channel of communication with the heart of the empire, Chusan is considered as the key of southern China, and was accordingly taken possession of by the British on two occasions during the first Chinese War. Notwithstanding the great mortality among the British troops during their occupation of the island, the climate is still considered healthful.

CHUTIA NAGPUR, choo'tē-ạ näg-poor'. See CHOTA NAGPUR.

CHUTNEY, chŭt'nĭ, a condiment compounded of sweets and acids, much used in the East Indies and thence introduced into England and the United States. Ripe fruit, especially mango and tamarinds, raisins, spices, herbs, chillies or cayenne, lemon-juice, vinegar, etc., are the ordinary components, which are pounded, well boiled together and then bottled for use. It is much eaten in India with curries, stews, etc.

CHUZZLEWIT, Martin, the principal character in Charles Dickens' novel of that name, published 1843–44.

CHYLE, kīl, the liquid mixture of foodstuffs taken up by the lacteals from the intestine in the course of digestion. It is not a definite substance, its composition varying very widely according to the character of the ingested food. See DIGESTION; LACTEALS; CHYME.

CHYME, kīm, a pulpy mass into which food in the stomach is resolved by the action of the gastric juice and by the contraction of the stomach. This mass is grayish in color and the previous texture or nature of the aliment can be no longer distinguished. It passes by the pylorus into the intestinal canal, where it is mixed with the pancreatic juice and the bile. The thinner parts of it are absorbed by the slender tubes termed "lacteals." The liquor thus absorbed, which is called "chyle" (q.v.), is of a white color; it passes through the glands of the mesentery, then enters the thoracic duct and is conveyed by it into the blood at the junction of the left jugular with the left subclavian vein. Chyle is an opaque milky fluid, mild to

the taste. By standing for some time one part of it coagulates; another portion is coagulated by heat. The chyle, after mixing with the lymph conveyed by the absorbent vessels, is received into the blood, which has returned from the extreme vessels before this passes to the heart. All traces of it are very soon lost in the blood, as it mixes perfectly with that fluid. It is probable, however, that its nature is not immediately completely altered. The blood passing from the heart is conveyed to the lungs, where it circulates over a very extensive surface presented to the atmospheric air, with the intervention of a very thin membrane, which does not prevent their mutual action. During this circulation the blood loses a considerable quantity of carbon, part of which, it is probable, is derived from the imperfectly assimilated chyle, as this, originating in part from vegetable matter, must contain carbon in larger proportion than even the blood itself. See DIGESTION; LYMPH; NUTRITION.

CIALDINI, chäl-dē'nē, **Enrico,** Italian soldier, statesman and diplomat; b. Castelvetro, Modena, 10 Aug. 1811; d. Leghorn, 8 Sept. 1892. For his share in the insurrection of 1831 he was forced to escape to France and in 1835 passing over to the Spanish service, he fought against the Carlists and was made colonel. When Charles Albert headed the Italian rising in 1848, he was employed by the Sardinian government to reduce the volunteers to discipline and fought at the head of his new regiment in the brief campaign of 1849. In the Crimea he commanded a division of the Sardinian contingent; and on his return was appointed aide-de-camp to the king. He was intrusted by Cavour with the formation of the famous Cacciatori delle Alpi. In the war of 1859 the victory at Palestro was his chief exploit. In 1860 he defeated the papal army at Castelfidardo; in 1861 Gaeta and Messina yielded to him. Created Duke of Caeta, and for a few months governor of Naples, he had to act against Garibaldi in the second Sicilian expedition (1862). In 1864 he became a senator; and in the war of 1866 occupied Venice almost without a blow. In 1876 he was sent as Ambassador to Paris, but he retired in 1881 and received the post of one of the two generals of the army.

CIAMICIAN, chā-mish'yăn, **Giacomo,** Italian chemist: b. Trieste, Austria-Hungary, 1857. He was educated at the University of Vienna. He became assistant at the Chemical Institute of Rome in 1880 and in 1887 was appointed professor of general chemistry at Padua. After 1889 he was professor of general chemistry at Bologna and in 1910 became a member of the Italian Senate. He published 'I problemi chimici del nuovo secolo' (1905); 'Organico e fisiologico chimica' (1908); 'Cooperazione delle scienze' (1911); Fotochimica nell' avenire' (1912).

CIAMPI, chām'pē, **Ignazio,** Italian poet and historian: b. Rome 1824; d. 21 Jan. 1880. From 1874 till his death he was professor of modern history in the University of Rome. Among his poetical works are some imitations of the Russian poet Pushkin; an epic, 'Stella'; and two volumes of 'Various Poems.' He wrote several works on the history of literature, also biographies and histories of special periods. His principal work appeared posthumously: 'Modern History,' from 1492 to the Peace of Westphalia.

CIAMPI, Sebastiano, Italian scholar: b. Pistoia, 30 Oct. 1769; d. Florence, 14 Dec. 1847. Ordained as a priest in 1793, he was appointed professor at the University of Pisa in 1803; owing to some misunderstanding with his colleagues, he accepted in 1818 a professorship at Warsaw and returned to Italy in 1822, a prebend having been conferred on him in Poland, which enabled him to devote himself to literary studies at Florence. His principal works treat of Italian literature and art, of ancient literature, of the Latin literature of the Middle Ages and of the history of Poland.

CIAMPOLI, chām-pō'lē, **Domenico,** Italian novelist: b. Atessa in Abruzzi, 25 Aug. 1855. He became professor of the history of literature at the Lyceum of Ancona and later librarian of the Victor Emmanuel Institution at Rome. His stories and romances are to a great extent pictures of life among the peasantry and mountain folk of southern Italy, of which may be mentioned 'Fiabe abruzzesi' (1877); and 'Cicuta' (1884). He has also written romances of a less local character; 'Diana'; 'The Unknown.' He has devoted special study to Slavic literature and published several volumes on that subject. He published also 'Nuovi studi letterarii e bibliografici' (1899).

CIBAO, se-bā'ō, a mountain range in the central part of Santo Domingo; length about 20 miles. When Columbus discovered the island, he was told by the natives that there was gold in the Cibao and he thought it to be a part of Japan. Gold was found there in 1494, by Ojeda.

CIBBER, sĭb'bĕr, **Caius Gabriel,** Danish sculptor: b. Flensborg, Holstein, 1630; d. London 1700. He visited England during the protectorate of Cromwell and met with such encouragement as to induce him to settle there. He was employed to execute the bas-reliefs on the pedestal of the London Monument. The work, however, by which he is principally known are his figures of Raving and Melancholy Madness, formerly erected above the gate of the old Bethlehem Hospital and now in the new hospital, Saint George's Fields. He was the father of Colley Cibber (q.v.).

CIBBER, Colley, English dramatist and actor: b. London, 6 Nov. 1671; d. there, 12 Dec. 1757. He was a son of C. G. Cibber (q.v.) and the sculptor's second wife, Jane Colley. He made his appearance at Drury Lane Theatre in 1689. In 1695 appeared his first comedy, 'Love's Last Shift,' which met with great success. In this piece he played the part of Novelty, a fashionable fop. This character is found in most of his pieces and in the representation of it he was likewise distinguished. His dramatic celebrity is founded chiefly on the 'Careless Husband,' which even obtained the approbation of his declared enemy, Pope. This piece, though without novelty in the characters and without invention in the plot, is a good picture of the manners and follies of the time. His comedy, the 'Non-juror,' an imitation of Molière's 'Tartufe,' adapted to English manners, appeared in 1717 and was directed against the Jacobites. It was very successful, but drew upon him many enemies, whose number he in-

creased by his conduct as director of Drury Lane Theatre, from 1711. His appointment as poet-laureate in 1730 gave full play to the raillery of his enemies. Cibber had the good sense to join in the laugh against his own verses. Pope, however, did not cease to ridicule him on every opportunity. Besides writing original works for the stage, he adapted a number of others, Shakespeare's Richard III being one of those that have passed through his hands. In 1750 he quitted the theatre and published the 'Apology for the Life of Colley Cibber,' written with spirit and candor and containing many entertaining ancedotes and judicious remarks.

CIBBER, Susannah Maria (ARNE), English actress: b. London, February 1714; d. there, 30 Jan. 1766. She was the sister of the celebrated Thomas Arne (composer of the music of 'Rule Britannia'), who taught her music and introduced her in one of his operas at the Haymarket Theatre. She was so much of a favorite with Handel, that he composed pieces expressly adapted to her voice and also instructed her in singing them. In 1734 she married Theophilus Cibber (q.v.), but was soon after separated from him. She subsequently made her appearance in tragedy. Her beauty and her talents gained her universal admiration. Garrick is said to have exclaimed when informed that she was dead, "Then tragedy has expired with her." She is buried in Westminster Abbey.

CIBBER, Theophilus, English actor and dramatist: b. 26 Nov. 1703; d. October 1758. He was the son of Colley Cibber (q.v.). Among his plays are 'The Lover' (1730); 'Patie and Peggy' (1730); 'The Auction.' The 'Biography of English and Irish Poets,' which appeared under his name, was from the pen of Robert Shiels, a Scotsman, who purchased for 10 guineas the right of prefixing to the work the name of Cibber, then in prison for debt.

CIBOL, sĭb'ŏl, a perennial plant (*Allium fistulosum*) of the onion genus, a native of Siberia, with hollow stems larger than those of the chive. It was formerly cultivated in Great Britain for culinary use, but it has been superseded by more palatable species. See ONION.

CIBORIUM, sĭ-bō'rĭ-um, the sacred vessel of silver or gold or silver-gilt and often incrusted with precious stones, in which the sacred host is reserved. Its liturgical name is pyx. In the language of architecture, ciborium is the name of the canopy which overhangs the high altar of a church.

CIBOTIUM, a genus of ferns of the family *Cyatheaceæ*, natives of Mexico, Polynesia and China. *C. barometz*, a Chinese species, gave rise to the wonderful stories concerning the Barometz or Scythian lamb, which, according to the famous botanist Bauhin (1650), had wool, flesh and blood and a root, attached to the navel and bore a perfect resemblance to a lamb, but grew on a stalk about a yard high and turning about from side to side consumed all the herbage within reach, until from lack of food it died. Not until 1725 was it explained authoritatively that the Barometz was merely the large root of a fern, covered with yellow down, which had been placed in a museum in an inverted position in such a manner that it resembled in a vague way some quadruped.

CIBRARIO, chē-brä'ryō, **Luigi,** Italian historian and politician: b. Turin, 23 Feb. 1802; d. Salo, 1 Oct. 1870. He studied law, entered the service of the state and soon distinguished himself by his historical investigations. In 1848, when Italy rose against the Austrians, Charles Albert appointed him commissioner at Venice and a senator of Sardinia. In 1852 he was made Minister of Public Instruction and ultimately, in 1855, Minister of Foreign Affairs. In 1839 he published his 'Della Economia Politica del Medio Evo'; in 1840, his 'Storia della Monarchia di Savoia'; and in 1847, his 'Storia di Torino.' He published numerous other works on history, numismatics and miscellaneous subjects.

CICACOLE, sĭk-ą-kōl'. See CHICACOLE.

CICADA, sĭ-kā'dą, a large insect of the order *Hemiptera*, sub-order *Homoptera* and family *Cicadidæ*, known by its broad head, protuberant eyes, sucking beak and well-developed ovipositor. The male cicada makes a shrill noise by means of a special apparatus at the base of the abdomen or hind-body. The males only possess this sound-organ. "Happy," said Xenarchus, "are the cicadas' lives, for they all have voiceless wives." The loud, piercing notes issue from a pair of structures or cavities on the under side of the body, which act somewhat as two kettle-drums or "timbals," each cavity being covered by a tense membrane which is rapidly vibrated by means of two special muscles within. The sound is variously modified by adjacent smaller disc-like sounding-boards, which increase and transmit the sound vibrations caused by the movement of the membrane. The sound is modified by the semi-circular discs, one on each side projecting from the metathorax over the "mirrors," cover-plates or sounding-boards, one on each side and which, when closed, deaden the sound, or, if open, allow it to escape in greater volume. This apparatus appears to be homologous with the "ears" of the locusts or common grasshoppers. Cicadæ have an incomplete metamorphosis, the young (nymphs) being like the parents, but without wings; they live attached by their beaks to the roots of trees, etc. The female deposits her long, slender, cylindrical eggs in gashes in twigs made by her saw-like ovipositor. From 400 to 600 eggs are laid, the process requiring about 45 minutes. The two commonest forms in the United States are the dogday harvest fly (*C. tibicen*) and the periodical cicada (*C. septendecem*). The former is the black-and-green harvest fly which appears in midsummer and gives out its shrill notes during the heat of the day from the tree tops. It matures in two years, but there being two broods, one appears every year. The 17-year cicada (wrongly called 17-year locust) is the longest-lived of any known insect, as the grub or nymph lives for over 16 years sucking the roots of forest trees, often several feet below the surface; in the late spring it finishes its transformations and usually at the last of May or the beginning of June issues in enormous numbers from the ground. This appearance of a 17-year brood in a given area has been recorded as far back as 1633. At the present time each year has its brood or broods, each limited, as a rule, to a

well-defined district. Of such broods there are 30, occurring over a large area in the Atlantic and Central States. In southern New England a brood periodically appears near Fall River and on Martha's Vineyard, as well as in Connecticut, while in Rhode Island its first appearance known in history was in the first week in June 1903, in the town of Coventry, near Tiogue reservoir. The southern limits are northern Georgia and the western limits are eastern Nebraska and Kansas. Besides this 17-year brood is a 13-year brood, which is more southern, the dividing line being about latitude 38°; this appears to be a temperate variety. The male is very short-lived and takes no food. The females live for several weeks and deposit their eggs about the middle of June in New York and West Virginia. The young hatch, dropping to the ground about six weeks after the eggs are laid; they then burrow into the soil and begin to pierce the rootlets of trees. The nymph molts about once a year or oftener and Riley estimates the number of molts at from 25 to 30, while there are six stages of growth before the imago or winged state is assumed. Consult Riley, 'The Periodical Cicada' ('Bulletin 8 United States Department of Agriculture'); Marlatt, C. L., 'The Periodical Cicada' (ib. 14, Washington 1898), and Woodworth, 'Synopsis North American Cicadidæ' (in *Psyche*, Vol. V, Cambridge, Mass., 1888).

CICATRIZATION, the process of healing in the skin of an ulcer or a wound. Where a solution of continuity of the skin is made the blood is thrown out into the gap, the edges of the wound are gummed together by serum, and, springing from both sides of the wound, new connective tissue is formed. This new connective tissue gradually fills the wound with a white glistening mass, the cicatrix. This contracts and all that may be left of the wound is a white shiny strip of new connective tissue.

CICELY, Sweet, a plant of the United States belonging to the natural order *Umbellifer*, a perennial herb growing from fleshy, clustered, thickish roots. There are about 15 species in North America, western South America and eastern Asia, grouped into the genus *Washingtonia*, so named in honor of George Washington. Eleven of the 15 are natives of the western United States. They are related to chevril (q.v.) on one side and to *Scandix* on the other. The smoother sweet cicely (*W. longistylus*) grows in the woods of southern Canada, through Dakota, eastward to North Carolina, southward to Tennessee and Alabama and westward to Kansas, and on elevations to the height of 4,200 feet. The roots have a rich spicy taste and odor, resembling anise. The sweet cicely of England (*Myrrhis odorata*), although common about buildings, is an imported plant, probably from central Asia. It is fragrant and its odor is supposed to be particularly agreeable to bees, therefore hives are rubbed with the herb to attract them.

CICER, sī'sẽr, a genus of the natural order *Leguminosæ*, of the tribe *Viciæ*, of which the chick-pea (q.v.) is a representative.

CICERO, Marcus Tullius, Roman orator and public man and the greatest master of Latin prose style: b. 106 B.C.; killed at Formiæ 43 B.C. Cicero was a native of Arpinum, the birthplace also of Marius. His father was a knight of good social position and the son was well educated in preparation for the bar and for public life. While still a young man he served a campaign under the elder Pompey. He first appeared as a lawyer in 81 and again in 80, and in the latter case was brought into direct collision with a favorite of Sulla, at that time perpetual dictator. It was perhaps in consequence of this that he withdrew for a time from Rome and spent the years 79–77 in Greece and Asia Minor, occupying himself with the further study of oratory. In 75 he began his political career by serving as quæstor in Sicily, and in 70 he gave evidence of the closeness of his relation to that province by prosecuting Verres for maladministration as governor there. In 69 he was curule ædile and in 66 prætor urbanus, following the usual course of offices; in the latter year he made his first distinctively political speech in support of a proposal by the tribune Manilius to give to Pompey the command of the war against Mithridates. Though the distinction between parties was then less sharp than it is now, he had thus far been connected with the democratic party, but in the canvass for the consulship for 63 that party had already two candidates in the field, Catiline and Antonius, while the Optimates had no candidate of special promise. As Catiline belonged to the radical wing of the democrats, the senatorial party, desiring his defeat, threw its influence in Cicero's favor. He was thus elected as a representative of the Optimates and continued to act with that party during the rest of his life. His constitutional instincts were further strengthened by the outbreak during his consulship (63) of the so-called conspiracy of Catiline, an attempt by the radicals under the leadership of this reckless noble to seize the government by violent means. This attempt Cicero put down with considerable vigor; Catiline was killed in battle and several of his associates were condemned to death by a vote of the Senate and executed under Cicero's orders. The execution, however, was of questionable legality, since it set aside the right of the accused to an appeal to the popular assembly, and Cicero was at once attacked by members of the democratic party for his responsibility in the transaction. Upon the formation, in 60, of the coalition between Cæsar, Pompey and Crassus called the First Triumvirate, by which the democrats came into control of the government, Cicero was banished from Rome and left Italy (April 58). The years preceding his exile had been years of great professional activity and some of the best of his speeches belong to this period, but he had not yet acquired the habit of literary production and the year of his absence was unfruitful except in letters. His return to Italy in 57 was made the occasion of a great party demonstration and was to some degree a personal triumph, and he engaged himself at once in suits for the recovery of his property and in the party struggles with the Triumvirate. During this period he also took up again his early studies in rhetoric and wrote the 'De Oratore,' one of his most finished and authoritative works. He had not up to this time followed the usual custom of taking the proconsular governorship of a province, but in 51, in compliance with a new law, though much against his will, he went as governor to Cilicia. He spent here exactly the year

required of him, from 31 July 51 to 30 July 50, but impatient as he was of the enforced absence from Rome his governorship was highly creditable to him; he showed, in particular, the most honorable scrupulousness in abstaining from even the customary exactions from the provincials. When he returned to Rome, he found all parties absorbed in the agitations which preceded the civil war. Early in 49 Cæsar marched upon Rome and Pompey withdrew to Dyrrachium. During these months Cicero remained away from the city in great uncertainty as to his duty and his interests. Cæsar asked of him only that he should remain neutral, and his own forebodings as to the outcome of the struggle inclined him toward this course, but his party connections, his constitutional prejudices and opinions and his lifelong respect for Pompey took him finally to the camp at Dyrrachium. After the victory of Cæsar at Pharsalus in August 48, he returned to Italy and spent a year in Brundisium, awaiting Cæsar's permission to go to Rome. From the summer of 47 to March 44 the domination of Cæsar put an end to free discussion and action in the state and Cicero made only a few speeches, addressed to Cæsar, with whom he had always been on terms of friendship, on behalf of persons desiring amnesty. But the enforced political inactivity he put to use in literature, and to this period belong almost all his greatest writings, the ripe fruits of a life of intellectual interests. In March 44 the assassination of Cæsar aroused in Cicero, though he was not cognizant of the plot, a renewed hope that the Senate might recover control of the state. But for the first few months events turned against his party; popular feeling did not approve the death of Cæsar, Antony was unexpectedly active and successful, and Cicero for a time thought of joining Brutus and Cassius in the East. As the confusion began to clear, however, and the old issue between constitutional government and the rule of a dictator took form, Cicero's indecision came to an end and he threw himself unreservedly into the contest of the Senate with Antony. The 14 Philippics, delivered between September 44 and March 43, are unmatched among his speeches. When Antony and Octavianus (the later Augustus) were reconciled and formed with Lepidus the Second Triumvirate, Cicero's name was placed upon the list of the proscribed, and he was killed at his villa near Formiæ, 7 Dec. 43.

The literary work of Cicero is in amount much greater than the extant work of any other Latin writer and in value is second only to the poems of Virgil. It consists of orations, rhetorical works, philosophical essays and collections of letters, and will be taken up in that order.

Of the orations we possess 57 in nearly complete form and the titles of some 50 more are known. The extant orations are about equally divided between speeches to the Senate or the people on public questions and legal pleas. Cicero spoke by preference on the side of the defense in both civil and criminal trials, sometimes making a close legal argument, but not infrequently using also political and even literary discussions to relieve the formal argument. The public orations are to a considerable extent invectives, especially the four orations against Catiline and the 14 Philippics against Antony, and these are at times bitter to a degree that modern taste would condemn, even in the most excited political struggles. But the wit, the fire, the humor and breadth, the easy handling of complex argument and the perfection of stylistic form are such that no critic, either ancient or modern, has seriously questioned Cicero's supremacy in Roman oratory.

The rhetorical works deal chiefly with oratory; several are text-books on the theory and practice of public speaking, one is a history of Roman oratory and one is a discussion of the ideal in oratory. While Cicero did not attempt a wholly novel treatment of these subjects, there is in the works much of the ripe judgment of the practised speaker who was interested also in the theory of his life work, and they contain some of his most finished and delightful writing.

The philosophical works are constitutional and ethical essays in dialogue form. Cicero himself regarded them as useful means of making educated Romans better acquainted with Greek philosophy, especially of the Academic and Stoic schools, and made for them no claim to originality of thought.

We possess also a collection of nearly 800 letters by Cicero, with nearly 100 more from his correspondents. They begin with the year 68 and with some breaks continue down to the year of his death. About half of them are addressed to his intimate friend T. Pomponius Atticus, the rest to various persons, including almost all the eminent men of his time. Some few of them are formal and guarded in expression, but the majority, especially those addressed to Atticus, are extremely intimate and confidential, written without thought of publication. They give a most interesting picture of the progress of events and changes of opinion during a critical period of Roman history, and they also reveal some of the weaknesses of Cicero's character and have furnished the material upon which the harsher judgments of his conduct have been founded.

The uncertainty of the judgment of posterity — to which appeal is often made as if it were always precise and infallible — was never better illustrated than in the history of opinion in regard to Cicero. During the earlier centuries after the Revival of Learning, when attention was fixed upon correct and elegant Latinity, the judgment which scholars formed in regard to Cicero's public career was really determined by their just admiration for his Latin style. And most scholars up to the beginning of the 19th century continued to occupy the uncritical position. But with the rise of historical science a revision of opinion was inevitable. This found expression in Drumann's history of Rome and later in Mommsen's history; in both of these writers, however, the extravagant and passionate discrediting of Cicero was as marked as the earlier unquestioning worship had been. The influence of Mommsen's authority is still to be seen in popular and school histories, though scholars have long understood its inaccuracy. But though opinion varies within narrower limits, it still varies somewhat, for reasons which are to be found partly in the character of Cicero and partly in the nature of the constitutional and political questions that are connected with his career. Cicero was, as most orators are, a

man in whose temperament emotion and sensibility were more controlling than intellect or will. Such a man is always liable to the charge of inconsistency and his conduct is certain to show extremes of weakness and of strength. On three occasions, in the trial of Roscius, in the affair with Catiline and in the struggle with Antony, he showed the hot courage of attack, but in the trial of Milo he failed to exhibit the cool and steady courage required to face mob violence. At the outbreak of the civil war he hesitated long — not wholly without reason — and after the death of Cæsar his vacillation amounted to weakness, but taken as a whole his public life was a consistent expression of his patriotic feeling. His depression during his exile was great but not greater than his cheerfulness during the unhappy years preceding 44. His vanity — of which Mommsen makes much — is indeed repellant to our taste, but it was a foible of his race; Cæsar, not in general a vain man, wrote the extraordinary dispatch, *Veni, vidi, vici*, and Horace, certainly a modest man, wrote the *Exegi monumentum*. A character in which an instinctive artistic perception and a trained intelligence are directed by the emotional temperament of the orator is not to be summarized in a formula.

The political situation, also, when an old constitution was giving way to personal rule, is of a kind about which men will always differ; half the discussion in regard to the character of Cicero is fundamentally an expression of opinion or feeling about such constitutional crises. The severest critics of Cicero have been German scholars, eminent indeed, but accustomed to feudal traditions and inexperienced in the workings of a free constitution. The judgment of English scholars, though not unanimous, has been more liberal.

Literature.— The best edition is C. F. W Müller's 'Teubner' (Leipzig, 9 vols.), text without commentary. Halm's editions of the orations have excellent German introductions and notes; the 'Letters' are well edited by Tyrrell (London). There are 'Lives' by Middleton (1741), Forsyth and Anthony Trollope; also 'Cicéron et ses Amis,' by Boissier and 'Cicero of Arpinum, a Political and Literary Biography' (Yale 1915).

EDWARD PARMELEE MORRIS,
Professor of Latin Language and Literature, Yale University.

CICERO, Quintus Tullius, Roman general and brother of Marcus Tullius Cicero (q.v.): b. about 102 B.C.; put to death by the messengers of Antonius 43 B.C. He was prætor in 62 B.C. and governor of Asia 61–58 B.C. In 55 B.C. he was legate to Cæsar, accompanied him to Britain, and in 54 commanded a legion in Gaul. In 51 he was a legate to his brother, Marcus Tullius, in Cilicia and in the civil war fought with Pompeius against Cæsar, but in 57 made peace with him. He was proscribed by the triumvirs and killed.

CICERONE, chĭch-ę-rō'nē, one who, in Italy and particularly in Rome, shows and explains to strangers curiosities and antiquities; hence, in general, a guide. The talkativeness of such attendants procured them the name ciceroni, in jocular allusion to Cicero. This term is falling into disuse, the official designation, servitore di piazza, or simply guida (guide), being used instead.

CICERO'S LETTERS. The letters, 'Epistulæ,' of Cicero cover a period of 25 years, from 68 to 43 B.C., the year of the orator's death, and are embraced in four groups:

(1) 'Epistulæ ad Familiares,' consisting of 16 books of letters to various friends, including an entire book of those addressed to his wife and children, and another book of those to his faithful freedman Tiro.

(2) 'Epistulæ ad Atticum,' likewise consisting of 16 books, a witness to the life-long friendship and intimate relations subsisting between Cicero and Titus Pomponius Atticus.

(3) 'Epistulæ ad Quintum Fratrem,' three books of letters to Cicero's brother Quintus.

(4) 'Epistulæ ad Marcum Brutum,' two books of letters to the Brutus who headed the conspiracy against Julius Cæsar.

The contents of the letters are so various that it is difficult in brief compass to give any adequate conception of their range and quality. Many of them deal directly with the stirring political issues of Cicero's own time, the strife of parties, the competition for office, the ambitious aspirations of Cæsar, Pompey and Crassus in the First Triumvirate, the struggle between Cæsar and Pompey and the chaotic conditions subsequent to Cæsar's assassination. Others have to do with the purely personal affairs of the writer, the publication of his works, the construction and furnishing of his villas or the gossip of the day. Several touch upon the domestic infelicities of Quintus Cicero and his wife, Pomponia, the sister of Atticus, in which Atticus naturally blamed Quintus, while Cicero blamed Pomponia.

Most of the letters are written in the more intimate style of the Roman *sermo familiaris*, contrasting strongly with the studied elegance of the formal style characteristic of Cicero's other works. Equally marked is the unreserved frankness with which Cicero discusses the men and measures of his day. In the letters to Atticus in particular he practises as little reserve as if he were writing a diary for his own private edification. As a result, some of the less attractive features of Cicero's personality are brought out in strong relief. Thus in 65 B.C. we find him writing to Atticus that he contemplates the defense of the unsavory Catiline. "I am thinking," he says, "of defending Catiline. We can have any jury we wish with the full consent of the prosecutor. If Catiline is acquitted, I hope it will make us better friends." Thus he writes of the man whose true character he knew well, and whom only two years later he was branding in his speeches with all the vituperation at his command. On his way into exile and later when in banishment he breaks out into the most disconsolate lamentations as to his hard lot, bewailing the sad fate of his wife and children and expressing regret that he had not committed suicide. Fifteen months later the exultation to which he gives utterance on his return to Italy and the capital is no less extravagant. In 52 B.C. he went to Cilicia in Asia Minor as provincial governor. He cannot dwell sufficiently upon the enthusiasm manifested at his arrival in the different towns through which he passed on his outward journey. A trivial military success over some wild mountain tribes within his jurisdiction impels him to write home in loud praises of his achievement.

The four collections above enumerated contain 774 letters written by Cicero. As many more are believed on good grounds to have existed in antiquity and to have been lost. Incorporated in the 'Epistulæ ad Familiares' and the 'Epistulæ ad Atticum' are some 90 letters written by Cicero's correspondents. Thus we have one entire book of letters from Cælius. Others from whom letters are preserved are Plancus, Cato, Pompey, Cassius, Lepidus and Asinius Pollio. One of the most notable letters is from Julius Cæsar, written in reply to one of Cicero. Cicero had praised the dictator for his magnanimity in sparing the lives of his opponents who had surrendered at Corfinium. Cæsar's reply breathes the same generous spirit which had prompted his act of clemency.

In their range, their sincerity, their connection with the events of the time and their intensely human quality, the 'Letters' are not only of commanding interest, but they are of the greatest value in helping us to understand the complex character of the orator and the tangled events of his day. In modern times the first manuscript of the 'Letters' was discovered by Petrarch in the 14th century. The great humanist was shocked at the new light thrown by them on Cicero's character, and composed his famous letter to Cicero. There is an excellent translation of all the letters by E. Shuckburgh in the Bohn Library; also of the 'Letters' to Atticus in the Loeb Library by E. O. Winstedt.

CHARLES E. BENNETT,
Professor of Latin, Cornell University.

CICISBEO, chē-chēs-bā'ō, or CAVALIERE SERVENTE, a name given since the 17th century in Italy to the professed gallant of a married lady. It was the fashion among the higher ranks in Italy for the husband, from the day of marriage, to associate with his wife in his own house only. In society or places of public amusement she was accompained by the cicisbeo, who even attended at her toilet, to receive her commands for the day. The custom is the more extraordinary, from the natural jealousy of the Italian, who seemed to change his character completely after marriage.

CICOGNARA, Leopoldo, COUNT DA, Italian antiquarian, diplomatist and writer on art subjects: b. Ferrera, 17 Nov. 1767; d. Venice, 5 March 1834. He studied at Modena and the Academy of San Luca, and was later appointed Ambassador to Turin, and councillor of state. In 1808 he became president of the Academy of Fine Arts in Venice. His most important work was a 'History of Sculpture from the Renaissance of that Art to the Present Century' (3 vols., 1813–18). He also wrote a 'Life of Canova' (1823).

CICONIA, sĭ-kō'nĭ-a, the genus of birds to which belongs the common stork, the type genus of the family *Ciconiidæ.*

CICONIFORMES, an order of *Aves* (birds), composed of the sub-orders *Steganopodes* (tropic birds, gannets, cormorants, frigate-birds and pelicans); *Ardeæ* (herons and bitterns); *Ciconii* (storks, ibises and spoonbills); and *Phœnicopteri* (flamingoes). All are aquatic or mainly so. See ORNITHOLOGY.

CICUTA, sĭ-kū'tą, a genus of poisonous unbelliferous plants commonly known as water-hemlock or cowbane, the species natives of North America. The plants are a dangerous poison, said to be fatal to cattle that eat them. Persons are known to have died from eating the roots which are white and fleshy. The common hemlock, *Conium maculatum,* a poisonous umbellifer, has a stem from two to four feet high, hollow, striated and spotted with purple; leaves large, much divided and fetid when bruised; and with unilateral partial involucres, marks by which the common hemlock is readily distinguished from the water-hemlock, and from other plants of the *Apriaceæ.* It is indigenous in Europe, and is extensively used in medicine, being given internally as a sedative, and applied externally to sores, ulcers, etc., in the form of a poultice or ointment. It may be the *koneion* (hemlock) of the Greeks, which Socrates and others condemned to death were required to drink. The Latin *cicuta* was the true hemlock. See HEMLOCK.

CID, El, ăl thĭd, or ĕl sĭd, the popular name of a Spanish national hero, Rodrigo (or Ruy) Diaz: b. Bivar about 1040; d. 1099. Legend and tradition have somewhat obscured the character of the historical Cid, but the main facts of his life are well established by Spanish and Arabic records. He first appears in national history when Sancho, the eldest son of Ferdinand I, and king of Castile, was at war with his brother, Alfonso; at this time he was already known as the *Campeador* (the champion), a name which he won probably by vanquishing in single combat the champion of Sancho of Navarre. In the war with Alfonso, Sancho was victorious, and this success was owing to the Cid, to whom he had given the command of his forces. Alfonso was taken prisoner, and it remained only to overcome the obstinate resistance of Zamora, where Sancho's sister, Urraca, ruled. Before the walls of this city Sancho was assassinated, and Alfonso was called to the throne. It is asserted — but the historical evidence here is not complete — that before recognizing Alfonso's authority the Castilian nobles required of him an oath that he had no part in his brother's murder, and that it was the Cid who administered this oath, in 1073. Whatever the facts, Alfonso must have thought it wise to conciliate the good-will of the Castilian grandees until at least his own position became secure, as he gave his cousin Jimena (or Ximena), daughter of the Count of Ovideo, to the Cid in marriage. The marriage contract, dated 1074, is preserved at Burgos. Later the king, taking advantage of a pretext that the Cid had attacked the Moors without obtaining the royal consent, banished him (1081). Old wrongs which the king still remembered probably furnished the real motive. Then begun that career of "soldier of fortune," which, idealized by tradition, has made the Cid the perfect cavalier of Spain. He first offered his services to the Christian Count of Barcelona, and, when refused by him, to the Moorish king of Saragossa, who accepted the offer. The Cid remained in Saragossa till 1088, fighting against Moors and Christians alike, and rising to unusual distinction and power. In 1088 the attention of Mostain, the king of Saragossa, was drawn to the city of Valencia, then under the protection of King Alfonso. The Almoravi-

des, a new Moslem sect from northern Africa, defeated Alfonso in battle, and caused him to withdraw his protection from Valencia, and the governor of the city appealed to Saragossa for help. The Cid was sent to the aid of the city in command of an expedition which proved successful, and he established himself in Valencian territory. As the recognized protector of the lawful king, in reality, the suzerain of Valencia, he received a generous tribute; but it is clear that he had already resolved, when opportunity offered, to secure the city for himself. Meanwhile he skilfully held off, now by force, now by ruse, all other competitors, Christian and Moslem alike; including among these King Alfonso, whose territories he once wasted with fire and sword. As head of an independent army, he made successful forays in all directions; despoiling, levying tribute, garrisoning strongholds and strengthening his position in every way, and in 1094 finally became master of Valencia itself. He successfully held the city till 1099, when the troops he had sent against the Almoravides were utterly routed, few escaping, and he already enfeebled in health, died, it is said, of grief and shame. His widow held Valencia for two years longer. He left two daughters, one of whom married the Count of Barcelona, and the other the Infante of Navarre.

The Cid very soon became the favorite hero of popular songs. It is probable that these songs were at first short stories in rude metrical form; and that they were the sources of the epic poems. The earliest of the epic poems is 'Poema del Cid' or 'Cantar de Mio Cid,' 'The Poem of My Cid,' based upon history, but with a large amount of legendary matter. Its date is probably about 1200. It is one of the best of mediæval folk epics, its characters being drawn with clearness and simplicity. Another poem of about the same date, 'The Legend or Chronicle of the Youth of Rodrigo,' is of inferior merit, though not without fine passages. Two centuries and more after these poems we meet with the 'Romances' or 'Ballads of the Cid.' The earliest of these do not in their present form far antedate 1500. These ballads are derived from all sources, but chiefly from the Cid legend, which is here treated in a lyric and popular tone.

These ballads make Jimena (or Ximena) Gomez the wife of the Cid and tell the legendary story of her father (Don Gomez), insulting the Cid's father, of the Cid's revenge by killing Don Gomez, of Jimena's pursuit of the Cid demanding justice of King Ferdinand and the final reconciliation through marriage. De Castro, in his drama, 'The Youth of the Cid,' drew his material from the ballads, but added love and the conflict between affection and the claims of honor in the mind of both Jimena and the Cid. Corneille based his drama, 'The Cid' (see CID, THE) upon that of Castro, using the same plot and the same struggle between love and duty on the part of the hero and heroine. Corneille condensed De Castro's 'The Cid,' gave it dramatic unity, and added greater dignity and nobility to the verse. His drama, when first put on the stage in France (1636), met with immediate success. Of the very first poem on El Cid, there are translations by A. M. Huntington (1901); J. H. Frere (1874); J. Ormsby (1879). Consult Huber, 'Geschichte des Cid' (Bremen 1829); Southey, 'Chronicle of the Cid' (London 1808); Menéndez Pidal, 'Cantar de Mio Cid: texto, grámmatica y vocabulario' (3 vols., Madrid 1908–11); ib., 'El Romancero español' (1910).

CID, The (Le Cid) (1636), the play through which Corneille first gained distinction as a dramatist, marks a turning point in the development of the French stage. The scene is Seville, at the court of Ferdinand, king of Castile; the time about 1075; the theme a struggle on the hero's part between love and honor, between duty and love on the heroine's. The kernel of the story belongs to historic tradition. In telling the deeds of Ruy Diaz de Bivar, the Cid Campeador, in the struggle of Christian and Moslem in Spain the chronicler Mariana records a duel between the Cid and the Count of Gormaz, a mainstay of the realm. In this encounter the Count was killed. His daughter and heir Ximena then "demanded of the king that he should give him to her as husband, for she was much attracted by his merits, or punish him according to the laws." They were married, continues Mariana, "with the approval of all." This theme had been already dramatized by the Spaniard Guillem de Castro and was the subject of several Spanish ballads. From all these sources Corneille borrowed freely whatever was to his purpose, but his treatment of the materials was independent and original. In his opening scene Chimène (Ximena) discovers to the inevitable *confidante* her love for Rodrique, the Cid: Then the king's daughter, L'Infante, tells her *confidante* that finding her own passion for Rodrigue hopeless she is resigned to see it extinguished by the marriage of its object to Chimène. But now arises an apparently insurmountable barrier in a quarrel over court preferment between Don Diego, the father of Rodrigue, and the father of Chimène. He insults Diego, whose age compels him to commit his honor to his son, who puts it magnanimously above his love. He kills Chimène's father, inopportunely for national defense, since an invasion of Moors impends. Chimène demands the death of her lover. She will "pursue him, destroy him and follow him in death." Yet she hides her love neither from herself nor from him. She will "do all in her power to avenge her father, but her sole hope is that she may avail nothing." While the king hesitates Rodrigue overcomes the Moors. Chimène finds a champion in Rodrigue's rival, Don Sanche, for she will marry her avenger. Yet, in desperate conflict with herself, she urges Rodrigue to do his utmost to save her from Sanche. Rodrigue "puts honor above Chimène, Chimène above life." She will yield herself to the victor. Rodrigue leaves her invincible. But presently Sanche appears to offer her a bleeding sword. He is scorned unheard. For her it shall be a convent, since she cannot wed Rodrigue. But it now appears that Rodrigue has sent the disarmed Sanche unharmed, for he "would destroy no life that had been ventured for Chimène," to give his own sword to her and tell of Rodrigue's victory. The king, her heart revealed, joins the lovers, betrothed at last.

The Cid broke radically with the traditions of the French stage, hitherto bound by largely misunderstood Aristotelian canons. Scudéry,

a critic of repute, thought its subject ill-chosen, its irregularity unpardonable, its action clumsy, its prosody bad. Cardinal Richelieu was jealous for he had literary foibles; the Academicians professed alarm. Corneille found it prudent to withdraw for three years from Paris to Rouen. But the play was popular from the first. Boileau found that "all Paris has for Rodrigue the eyes of Chimène" and, though this tragi-comedy lacks ethical depth and tragic force, it is still most acted of Corneille's dramas. 'Le Cid' is best edited with English notes by C. Searles (Boston 1912); translated by Mongan (New York 1896). Consult Gasté, 'La Querelle du Cid' (Paris 1878) and Searles, C., 'Les Sentiments de l'Academie Française sur Le Cid' (Minneapolis 1916).

BENJAMIN W. WELLS.

CIDER, the pressed fermented juice of apples; a beverage, the quality of which depends principally on the following particulars: kind of fruit, condition of the fruit when ground, manner of grinding and pressing, method of producing fermentation, and precautions to be taken against its excess.

The Kind of Fruit.— The characteristics of a good cider apple are a red skin, yellow and often tough and fibrous pulp, astringency, dryness, and ripeness at the cider-making season. The only artificial criterion for ascertaining the quality of an apple for cider is the specific gravity of its must, or unfermented juice; or the weight compared with that of water. This indicates with very considerable accuracy the strength of the future cider. Its weight and consequent value are supposed to be increased in the ratio of the increase of saccharine matter. The strongest and most highly flavored cider which has been obtained from the apple was produced from fruit growing on a shallow loam, on a limestone basis. All the writers on the subject seem to agree that calcareous earth should form a component part of the soil of a cider orchard. A dry and somewhat loose soil is preferred.

Condition of the Fruit.— Fruit should be used when it has attained full maturity, and before it begins to decay. Each kind of apple should be manufactured separately, or at least those kinds only should be mixed which ripen about the same time. The longer the fruit remains on the tree without decay or being injured by frost the better, for not only is the perfect maturity of the juice an important consideration, but the colder the weather, short of actual frost, the more quiet and equable will be the fermentation. When gathered the apples should be carefully stored in some shady, cool room, and placed in heaps to undergo a further ripening, and acquire more saccharine matter while losing a considerable quantity of watery juice.

Grinding, etc.— This operation should be deferred till December, if possible. It is absolutely essential that the weather should be cold, even slightly frosty, to counteract the tendency to rapid fermentation. The apples should be reduced by the mill as nearly as possible to a uniform mass, in which the rind and seeds are scarcely discoverable, and the pomace should be exposed to the air. It has been ascertained that, by exposing the reduced pulp to the operation of the atmosphere for a few hours, the specific gravity of the juice increases from 1.064 to 1.078. For fine cider the fruit should be ground and pressed imperfectly, and the pulp then exposed 24 hours to the air, being spread and once or twice turned, to facilitate the absorption of oxygen; it should be then ground again, and the expressed juice added to it before it is again pressed. The best method of grinding the apples is to employ cylindrical rollers placed so near each other as to crush them. They are fed from a hopper above them, from which the apples pass between a pair of fluted or toothed cylinders, by which they are torn and partially crushed before reaching the more perfectly crushing apparatus below. The mass is then powerfully pressed, and the cider is run into casks.

Fermentation.— The vinous fermentation commences and terminates at different periods, according to the condition and quality of the fruit and the state of the weather. The best thing whereby to judge of the proper moment to draw the liquor from the scum and sediment is the brightness of the liquid which appears after the discharge of fixed air has ceased and a thick crust has collected on the surface. The clear liquor should then be drawn off into another cask. If it remains bright and quiet, nothing more need be done to it till the succeeding spring; but if a scum collects on the surface it must immediately be racked off again, as this would produce bad effects if suffered to sink. Among the precautions used to prevent excessive fermentation is stumming, which is fuming the cask with burning sulphur. This is done by burning a rag impregnated with sulphur in the cask in which the liquid is to be decanted, after it has been partly filled, and rolling it so as to incorporate the liquid with the gas. By distillation, a strongly fermented cider called cider brandy or applejack is produced, containing a larger percentage of alcohol. A species of vinegar is also made from cider. See VINEGAR.

CIENFUEGOS, thē-ĕn'foo-ā'gōs, **Nicasio Alvarez de,** Spanish poet: b. Madrid, 14 Dec. 1764; d. Orthez, France, July 1809. He studied at Salamanca at the time when the modern school of Spanish poetry was founded there by Cadalso and Melendez. He attached himself to this school, and in 1798 laid the foundation of his literary fame by the publication of a collection of poems. Shortly after he became editor of the government newspapers, *La Gaceta* and *El Mercurio,* and was appointed to the Department of Foreign Affairs. He was in possession of this office when the war of independence broke out. Madrid was occupied by the French and Cienfuegos, having both offended Murat by an article in *La Gaceta* and taken part in the insurrection of May 1808, was brought to trial and condemned to death. At the intercession of some influential friends the sentence was commuted to banishment to France. His tragedy, 'Pitaco,' had procured his admission to the Spanish Academy. He also wrote the tragedy of 'Idomeneo,' and the comedy of the 'Magnanimous Sisters.' His tragedies are considered his best works. His dramas were collected and published at Barcelona 1836. Consult 'Poesías' (in 'Biblioteca de Autores Españoles,' Vol. LXVII); Piñeyro, 'Cienfuegos' (in *Bulletin Hispanique,* Vol. XI, Bordeaux 1909).

CIENFUEGOS, Cuba, city in the province of Santa Clara, on the south side of the island. Its harbor, which is one of the finest in the West Indies, was visited by Columbus on his first voyage, and was surveyed by Ocampo in 1508. The town was settled by refugees from Santo Domingo in 1819. Here the revolutionist Narciso Lopez planned to make his first demonstration on 4 July 1847. (See also CUBA). In recent years its commercial progress has been rapid, and it is now the second seaport of Cuba. Some of the sugar estates in the neighborhood are very large, and conducted on the most approved modern plan; in fact, Cienfuegos is the centre of the sugar trade on the Caribbean coast. It is a city of attractive, well-shaded streets, and substantially built houses. One of its plazas is the largest in Cuba. Among the principal buildings are the governor's house, market, railroad station and military and government hospitals. Water from the aqueduct is supplied to 42 per cent of the dwellings; from wells, to 47 per cent; from cisterns, to 7 per cent. There are social clubs, a theatre, etc. The city is lighted by gas and electricity. The climate from May to November cannot be highly commended, the air having an excess of moisture, and the temperature ranging from 75° to 98° F. The winter months, however, are very agreeable, winds from the north prevailing, and the temperature ranging from 60° to 78° F. during the day, with cooler nights. Cienfuegos is connected by rail with Sagua la Grande, on the opposite coast; with Santa Clara, the western terminus of the Cuba Company's main line to Santiago; with Havana, etc. By steamer it is in regular communication with New York, as well as with ports of the southern coast of Cuba from Santiago to Batabano. The census taken during the first American intervention showed: number of inhabitants engaged in trade and transportation, 3,065; in agriculture, fisheries and mining, 901; in personal service, 4,004; in manufactures and mechanical industries, 3,221; in professional service, 294; without gainful occupation, 18,553; total school attendance 3,832; number of persons able to read, 18,052, or 60 per cent—a higher percentage in this respect being found among Cuban cities only in Havana (66 per cent) and Puerto Principe (62 per cent). Foreign-born, 11.6 per cent of the city's population. The white people numbered 19,220; negroes, 3,068; mixed, 7,401; and Chinese, 349. Population, 30,100 in 1907; (est.) 31,000 for the city proper in 1916.

CIESZKOWSKI, tsē'ąsh-kôv'skē, **August,** COUNT, Polish philosopher and economist: b. Sucha, Podlachia, 1814; d. 1894. He was educated at the University of Berlin, was one of the founders of the *Biblioteka Warszawska,* and in 1848 settled in Posen. For many years he served as deputy in the Prussian Chamber of Deputies. He tried but in vain to establish a university in Posen and in 1872 was made a member of the Cracow Academy. He combated the pantheism of Hegel and developed his own concepts of God, the immortality of the soul and the divinity of Christ. His best known works are 'Prolegomena zur Historiosophie' (1838); 'Gott und Palingenesie' (1842); 'De la pairie et de l'aristocratie moderne' (1844); 'Du crédit et de la circulation' (1847); 'Ojcze-Nasz' (1848) and 'O drogach ducha' (1869).

CIEZA, thē-ā'tha, Spain, town in the province of Murcia, and 26 miles northwest of the city of Murcia, on an eminence near the right bank of the Segura. It has spacious streets, a large church and ancient tower, manufactures of linen and hempen fabrics, and a trade in corn, wine, oil and silk. Pop. 14,393.

CIGAR (of uncertain etymology; it cannot be connected with any West Indian speech, and the customary derivation from Sp. *cigarra,* cicada, in allusion to a similarity of outline is generally denied by scholars; Sp. *cigarro.* Also incorrectly spelled *segar*), a short compact roll of tobacco leaf for smoking. This form was borrowed by the Spanish invaders from the Indians of Cuba. When the Spaniards found that tobacco would grow elsewhere, they transplanted it to their possessions in the Philippines and to other localities. The Manila cheroot is the common form in which tobacco is smoked in the Far East. This cheroot is a roll cut off squarely at both ends and is shorter than American cigars. Rolling tobacco into cigars was not generally practised in Virginia and the Carolinas for a long time after the settlement of those sections by the English, for there the Indians invariably smoked their tobacco in pipes, but finally the convenience and superior flavor these rolls possessed made their use quite common some years before the Declaration of Independence of the American colonies. In Cuba, Mexico and Central America and, in fact, in all Spanish-speaking countries, the use of a pipe to this day is a rarity, the inevitable *cigarro* or *cigarette* ("little cigar") being found constantly in use.

The moist climate, the character of the soil and the peculiar preservative qualities of the air make Cuba the true home of the perfect cigar. There are but half a dozen valleys, mostly in the western end of the island, in the province of Pinar del Rio, where the finest cigar tobacco is grown and cured, the most important being the Vuelta Abajo district. In this section the soil is of volcanic origin. It is the color of chocolate, and of great depth. The fields are carefully and scientifically fertilized from year to year to preserve the proper proportion of chemical ingredients necessary to produce the finest tobacco. It has been truly said that the making of a cigar begins with the cultivation of the tobacco leaf. The flavor of the cigar depends essentially upon the harvesting of the leaf at exactly the proper moment. The finest quality of tobacco may be reduced to an inferior grade by gathering it while the juices are too green. Having been gathered, the Cuban tobacco leaves are hung in curing-houses, where they remain for seven weeks, during which time the color changes from the rich green of the growing plant to the peculiar shade of brown assumed by the specific variety under consideration. Having safely passed this stage, the tobacco is "sweated" in piles for a day or two, and is then baled and placed in a storage warehouse where it undergoes a fermentation process. It remains in this storage for from one to two years, according to the grade of cigars in which it is to be used—the longer the storage, the finer the smoking qualities. Havana tobacco thus prepared is of an even dark brown color, without spots or stains. The finest quality brings as

high as $20 a pound. The excellence of the Havana cigar does not depend wholly on the quality of the tobacco, but is due in part to the skill of the Cuban cigar-maker who knows what blending of leaf will yield the choicest flavor. Perhaps the next best grade of cigar tobacco comes from Porto Rico. The removal of the duty on manufactured cigars from that island in 1903 flooded the United States with cigars from there, many of them very inferior. In order to avoid paying the high duties on Cuban-made cigars, the device was early tried of bringing the tobacco over to the small island of Key West, a part of the State of Florida, separated from Cuba by only an 80-mile-wide strait. It was thought that the climatic conditions there would be so similar to those of Cuba that an equally fine cigar could be made there, while the importation of the tobacco in bulk cut down the duties very materially. The "Key West" cigar is much cheaper than the one made in Cuba, but the flavor, for some reason, is inferior. The manufacturers even brought cigar-makers from Cuba to Key West, so that so far as possible the product might be the same as the original, but in vain. It has been discovered by experts of the Department of Agriculture that in Ohio and Texas are certain areas which possess a soil so similar to that of the celebrated Vuelta Abajo district of Cuba that it is possible to raise tobacco there that will equal the Cuban. Samples of the leaf grown there and submitted to dealers in New York and Philadelphia, who were not told where it came from, proved to be so similar to that of Cuba that it was pronounced pure Havana leaf of the best quality. The pioneer in the manufacture of Key West cigars was Gen. J. H. Gregory, who gained his military title in the first war for Cuban independence, and was familiar with the internal resources of Cuba.

The cigar is made up usually of two parts: the filler and the wrapper. In some makes there is also an intermediate strip placed around the filler, known as the binder. In the cigars made in Cuba (so-called Havana cigars), the filler and wrapper are of the same tobacco. In the cigars made in the United States, the filler is generally of one kind of tobacco, and the wrapper of another. About one-sixth of the tobacco used in cigar making in the United States is imported. The imported filler tobacco comes chiefly from Cuba, Porto Rico, Mexico, Brazil and the Philippines, and the wrapper tobacco from the Dutch East Indies and Cuba. The best tobacco for wrappers is grown in Sumatra. Connecticut wrappers are also much used, being supple and tough. The best cigars made within the limits of the United States are undoubtedly those manufactured in Key West, of Cuban tobacco with a Connecticut wrapper. Those with Virginia, Carolina, Pennsylvania and other tobaccos as the filler, with the Connecticut wrapper, are of inferior quality, but sell in large quantities, because of their cheapness. Tobacco for the "little cigars," cheroots and all cheaper brands is grown in Wisconsin, Connecticut, New York, Pennsylvania, Ohio and Florida.

Tobacco comes to the cigar manufactory in bundles, or bales, that suitable for wrappers being in separate packages. When the leaf is received the bales are opened, and the leaf spread out and sprayed with water. It is then piled for some hours until it has become moist throughout and pliant. It is then graded, and placed in bins for further curing of from one to six weeks. Tobacco leaf is highly absorbent and readily takes up odors from the air. If these are foul, the effect on the tobacco will utterly ruin the cigars made from it. The best temperature in which to keep the tobacco leaf is 65° F., and the moisture content of the air should be about 70 per cent. As it becomes "ripe" it is taken to the cigar-makers. The operative spreads the filler leaf on his bench, with a small quantity of the wrapper beside him. He rolls the filler into the proper shape and firmness, then deftly cuts a portion of leaf to form a wrapper, winds the wrapper about the filler and secures the ends with paste. This is the standard method. Some popular grades are made by machinery, but hand-made cigars are generally considered the best. The cigars are passed upon critically by a foreman who rejects those not up to the standard of the factory. The passed cigars are placed in large cedar bins for seasoning. Finally they are sorted according to color, and packed into boxes. In general there are five distinct color grades: (1) Claro or Clara, a very light brown; (2) Colorado Clara, light brown; (3) Colorado, medium brown; (4) Colorado Maduro, dark brown; and (5) Maduro, very dark, almost black. As a fact, however, in large factories up to 32 shades of brown are recognized. The color, while usually considered an indication of the strength of the cigar, has in reality nothing to do with it, the wrapper giving no perceptible flavor to the cigar, constituting but about two per cent of it. And actually the flavor depends mostly upon the age at which the leaf was cut, and the time and skill bestowed upon its curing. The dark tobacco is the more likely to be ripe, and therefore superior in quality, and likely to be much milder than the very light cigars. In 1914 there were 16,754 manufacturers of cigars and 381 manufacturers of cigarettes operating in the United States. The total output for that year was 16,869,520,463 — an increase in the year of 1,298,722,016. In 1917 the output was 8,266,770,593 cigars, an increase of 876,587,423 over the previous year and the largest output on record. In the same year 35,377,751 pounds of snuff were manufactured and 445,763,206 pounds of smoking and chewing tobacco. The average quantity of unstemmed tobacco required to make 1,000 of the cigars weighing more than three pounds was 21.45 pounds. The average quantity used to make 1,000 little cigars was 6.46 pounds; the average for cigarettes was 3.68 pounds. The total quantity of leaf tobacco used in making the 1914 output was 157,967,457 pounds for cigars, and 62,209,366 pounds for cigarettes — a total of 220,176,823 pounds. In that year the United States imported 7,863,130 pounds of wrapper tobacco (valued at $9,992,276) and 49,543,392 pounds of other leaf tobacco (valued at $24,779,771). Of the latter, a considerable amount was used by cigarette-makers — the figures for cigar tobacco are not kept separate by the Department of Commerce. Of the wrapper tobacco, 7,688,514 pounds was "Sumatra" leaf, from the Dutch East Indies, and 117,315 pounds Cuban leaf. Of the other leaf tobacco, Cuba supplied 25,601,021 pounds

(valued at $14,504,856), Turkey, 21,141,402 pounds (valued at $9,014,612), and Porto Rico, 6,353,528 pounds (valued at $2,805,532). The influence of the European War upon the tobacco imports of the United States may be seen by comparing the following figures for the fiscal year ended 30 June 1916 with those of the calendar year 1914 given above. Of wrapper tobacco there was imported in the year ended 30 June 1916, 5,070,308 pounds, valued at $7,246,933. Of this, 4,963,961 pounds came from the Dutch East Indies. Of other leaf tobacco there were imported 42,943,027 pounds, valued at $17,372,126. Of this, 23,920,859 pounds came from Cuba, and 6,705,823 pounds from Porto Rico. The usual importation of Turkish tobacco was entirely lacking.

The importation of cigars was: from the Philippines, 1,081,840 pounds, valued at $1,369,836 (in 1914, 798,744 pounds, valued at $1,238,306); all others, 564,116 pounds, valued at $3,373,042 (in 1914, 552,251 pounds, valued at $3,232,390). In addition Porto Rico supplied 156,996,000 cigars and cheroots, valued at $5,528,406. Of cigarettes, there were imported 52,780 pounds, valued at $72,325 (in 1914, 40,777 pounds, valued at $63,219). Of cigars exported, there were 1,394 pounds, valued at $24,439; of cigarettes, 2,612,389 pounds, valued at $4,325,513.

For further details, including the culture and preparation of tobacco-leaf, see TOBACCO. Consult also Brennan, W. A., 'Tobacco Leaves' (Menasha, Wis., 1915).

CIGARETTE. See CIGAR.

CIGNANI, chēn-yä'nē, **Carlo,** Italian painter: b. Bologna, 15 May 1628; d. Forli, 6 Sept. 1719. He was a pupil of Albano. He knew how to compose, like the Carracci, and to distribute his figures in such a way that his paintings appear larger than they really are. His finest fresco paintings are at Saint Michael in Bosco, at Bologna, in ovals supported by angels, and in the salon of the Farnese Palace, where he represented Francis I of France touching for the king's evil. In his painting of the Assumption, at Forli, he has imitated the beautiful Michael of Guido in the cupola at Ravenna, and other fine conceptions of this painter; but in other pieces he made Correggio his model. He does not so often introduce foreshortenings as the Lombards; and in his outlines and drapery he possesses a finish peculiar to himself. His pencil is powerful, and his coloring lively. Clement XI conferred on him several marks of distinction. His paintings have been engraved by various artists.

CIGNAROLI, chēn-yä-rō'lē, **Giovanni Bettino,** Italian painter: b. Salo, near Verona, 1706; d. Verona, 1 Dec. 1770. His best works are in the cathedrals of Pisa, Bergamo, Mantua and in the churches of his native city and of Ferrara. He educated a numerous school at Verona, and received several invitations to visit foreign courts, which he invariably declined. In style he resembled Carlo Maratti, but formed himself on the works of Guido and Correggio. He was a man of literary culture, and wrote with discrimination and taste on various subjects.

CILIA, sĭl'ĭ-ą (Latin, "eyelashes"), small, generally microscopic, hair-like organs or appendages, averaging $\frac{1}{3000}$ inch in length, found on the surface of the tissues of most animals, and in some vegetable organisms (as algæ), chiefly on tissues which are in contact with water, or which produce fluid secretions. They are constantly in a state of active movement, and communicate to the fluid with which they are in contact a corresponding motion. This is called vibratile or ciliary motion. In most of the lower aquatic animals the respiratory function is aided by means of the vibratile cilia; many animalculæ move by a similar mechanism; and in the highest classes of animals cilia have a share in the performance of some important functions.

CILIATA, sĭl-ĭ-ā'tą, a group of *Protozoa,* and to which belong most of the *Infusoria* (q.v.). The body is covered with cilia, and it is either free or stalked and attached to submerged plants, etc. The group comprises the most specialized *Protozoa,* including the trumpet-animalcule (*Stentor*), the bell-animalcules (*Vorticella* and *Epistylis*). In these one-celled animals there is for the first time in the animal kingdom, as we ascend from the simplest organisms, a permanent aperture (cytosome) corresponding to the mouth of the higher animals, and an œsophagus (cytopharynx), and the undigested or waste portions of the food are cast out at a fixed point or opening (cytopyge), usually not detected when not used. There is also in the *stentor,* etc., a definite spiral muscle, while nettling bodies (trichocyst), like minute rods, in rare cases occur, and are supposed to be defensive in their nature. The ciliate infusoria reproduce by fission, budding and also by conjugation, molting in the origin of spores or embryos. Certain forms are parasitic; thus the skin disease called eczema has been attributed to the presence of parasitic *vorticellæ,* and a flattened oval free form occurs in the large intestines of men ill with diarrhœa.

CILICIA, sĭ-lĭsh'ĭ-ą, in ancient geography the maritime country between Pamphylia on the west and Syria on the east, lying south of the Taurus Mountain range along the extreme northeastern area of the Mediterranean Sea. The inhabitants of the coasts were formidable as pirates, and even disturbed the Ægean and Ionian seas. The inhabitants of the northern portion lived in part a nomadic life; those in the east were devoted to agriculture. Its capital city was Tarsus. Alexander made Cilicia a Macedonian province after which many Greeks settled there. Later Cilicia passed to the Syrians. Pompey subdued its piratical inhabitants. The mountainous parts were left in the hands of the native princes; the rest, in 67–66 B.C., was constituted a Roman province, of which Cicero was proconsul in 51–50 B.C. It is now a part of the Turkish vilayet of Adana.

CIMABUE, chē-mä-boo'ā, **Giovanni,** Italian artist: b. Florence 1240; d. there about 1302. Two Greek artists, who were invited to Florence by the Senate to paint a chapel in the church of Santa Maria Novella, were his first masters. Although these artists handled the pencil awkwardly, they however taught him, according to ancient tradition, the proportions which the Greek artists had observed in their imitations of the human figure. Attentive to their instructions, Cimabue studied principally the fine antique statues. He was the first to point out to succeeding painters the elements

of the *beau ideal,* the memory of which had been extinguished during several centuries of disorder. It is true the paintings of Cimabue do not exhibit that harmonious distribution of light and shade which forms the chiaroscuro. His coloring is dry, flat and cold; the outlines of his figures intersect each other on a blue, green or yellow ground, according to the effect which he had in view. He had no idea of linear and aerial perspective. His paintings are, properly speaking, only monochromes. But these faults, which are to be attributed to the infancy of the art, are compensated for by beauties of a high order — a grand style, accurate drawing, natural expression, noble grouping and a fine disposition of his drapery. His best paintings are in the church of Santa Maria Novella at Florence, and in the Sacro Convento at Assisi. He may be considered the link between the ancient and modern schools of painting. Cimabue evinced a generous appreciation of Giotto, whom tradition says he discovered drawing figures on the smooth surface of a rock while tending his sheep, and whom he took with him to Florence, and instructed with such success that the pupil soon excelled his master. It should be added that there is very little corroborating testimony regarding the works attributed to him by Vasari, and a destructive critic wrote in the *Nineteenth Century* for March 1903. "All, then, that we know about this Cenni di Pepi is that he was a distinguished Florentine artist; that he was nicknamed Cimabue; that he flourished in the closing years of the 13th century and the early years of the 14th, and that he executed a mosaic and an altar-piece at Pisa, of which the latter has disappeared and the former has been entirely renewed."

CIMAROSA, chēmä-rō'-zä, **Domenico,** Italian composer: b. Aversa, near Naples, 17 Dec. 1749; d. Venice, 11 Jan. 1801. He received his first musical instruction from Sacchini, entered the conservatory of Loretto, where he imbibed the principles of the school of Durante, and studied with great assiduity. He soon displayed his superiority in the 'Sacrificio di Abramo,' the 'Olimpiade' and other compositions. At the age of 25 he had already gained the applause of the principal theatres of Italy. He was invited to Saint Petersburg (where he remained four years) and to several German courts to compose heroic and comic operas. In the latter he particularly distinguished himself by the novelty, warmth, humor and liveliness of his ideas, and by a thorough acquaintance with stage effects. Among his 120 operas the most celebrated are 'Penelope'; 'Gli Orazj e Curiazj'; and 'Artaserse,' among the *opere serie;* and among the *opere buffe,* 'L'Italiano in Londra'; 'L'Amor Costante'; 'Il Pittore Cariginо'; and many others. His comic opera, 'Il Matrimonio Segreto,' excited general enthusiasm, and received the signal honor of being performed twice on the same evening, at the desire of the Emperor Leopold. From Vienna he went to Naples, and became involved there in the revolutionary commotions. He died from the effects of the ill treatment which he had been subjected to in prison. His bust, by Canova, was placed in the Pantheon at Rome in 1816 by the side of those of Sacchini and Paesiello.

CIMBRI, kĭm'brē, a tribe which inhabited Jutland (the Chersonesus Cimbrica), whence they sallied, together with the Teutones, and became among the most formidable of the enemies of Rome. In the year 114 B.C., when the Romans were already masters of a part of the eastern Alps, in the present Carniola, Istria, etc., and had established themselves in Dalmatia and Illyria, along the coast, immense bodies of barbarians suddenly made their appearance, who overcame the consul Papirius Carbo in the country now called Styria; but instead of entering Italy they proceeded to the north, and soon after, jointly with the Tigurians, entered the territory of the Allobroges. The Romans sent two armies, commanded by the consuls L. Cassius and M. Aurelius Scaurus, to oppose them, but both were defeated — the former by the Tigurians, the latter by the Cimbri. Even after this success the victors did not enter Italy, but overran Gaul with three bodies, consisting of Teutones, Cimbri and Ambrones. Two new armies, with which the consul C. Manlius and the proconsul Q. Servilius Cæpio hastened to oppose them, were likewise defeated beyond the Rhodanus. The Romans lost, according to Aetius, 80,000 men. While Rome placed her last hope in Marius, the barbarians overran the other western countries of Europe. Gaul suffered severely, but the Iberians and Belgians repulsed the invaders. Upon this they resolved to descend into Italy. The Teutones and Ambrones were to enter on the western side of the Alps, the Cimbri and Tigurians on the east. After Marius had waited the approach of the first during three entire years, and had accustomed his troops to their appearance, he routed them completely (102 B.C.) in two days — on the first day the Ambrones, on the second the Teutones — at Aix in Provence. The Cimbri, on the other hand, who had driven back the consul Catulus on the Adige, and had spread themselves along the Po, demanded land of the Romans, but were totally routed by Marius at Vercelli 101 B.C. About a century after this the Cimbri sent (from the Cimbrian Chersonesus) an embassy to the Roman emperor Augustus, to offer him presents and to ask pardon for what they had previously done against the Romans. The nationality of the Cimbri is a disputed point. Similarity of name led the ancients to identify them with the Cimmerians, but this view is no longer held. Some authorities believe them to have been of Germanic, others of Celtic race. Their name certainly has a great resemblance to that of the Celtic Kymri; and their armor and customs, according to Plutarch and Strabo, were very different from those of the Germans. "All these circumstances," says Schmitz, in Smith's 'Dictionary of Greek and Roman Geography,' "render it in the highest degree probable that the Cimbri were a Celtic or Gallic and not a Germanic nation."

CIMBRIAN PANIC, The, a Roman panic after the annihilation of five armies by the Cimbrians 105 B.C. This panic rose to its climax after the terrible defeat of Cæpio, the consul, in Gallia Narbonensis.

CIMEX LECTULARIUS, sī'mĕks lĕc-tū-lăr'ę-ŭs. See BEDBUG.

CIMICIFUGA, sĭ-mĭ-sĭf'ū-gą, from the Latin "to drive away," so named because cer-

tain species are used to drive away bugs and other insects. The plant is a genus of the crow-foot family, comprising about 20 species, natives of North America, Asia and Europe. The best known American species, because of their medicinal properties, are the bugbane (*Cimicifuga americana*) (q.v.) and the black snakeroot or black cohosh (*C. raceomsa*), supposed to be an antidote for the venom of serpents.

In medicine cimicifuga is used largely by the eclectics as a digestant, cardiac tonic and uterine stimulant. Its active principles have never been thoroughly determined and little is known of its physiological action as determined by exact pharmacological experiment.

CIMMERIAN, BOSPORUS, sĭ-mē-rĭ'ăn, an ancient name for the Strait of Kaffa.

CIMMERIANS, a tribe half-mythical, half-historical, described first in the Odyssey as dwelling beyond the ocean-stream, in thickest gloom, unvisited by Helios. Hence the term, "Cimmerian gloom." From Herodotus we learn that they originally inhabited the country between the Borysthenes and the Tanais, but expelled by the Scythians, they traveled along the shores of the Euxine, passed through Colchis and over the Halys, and entered Asia to the west of that river. Against this it is urged that the route by the Euxine would be impassable for a nomadic people, the Caucasus running down to the very shores of that sea. The sum of our certain knowledge respecting this people is, that they seem to have been the chief occupants of the Tauric Chersonesus (the Crimea), where they had a large city, near which were fortifications enclosing the isthmus by an earthen wall.

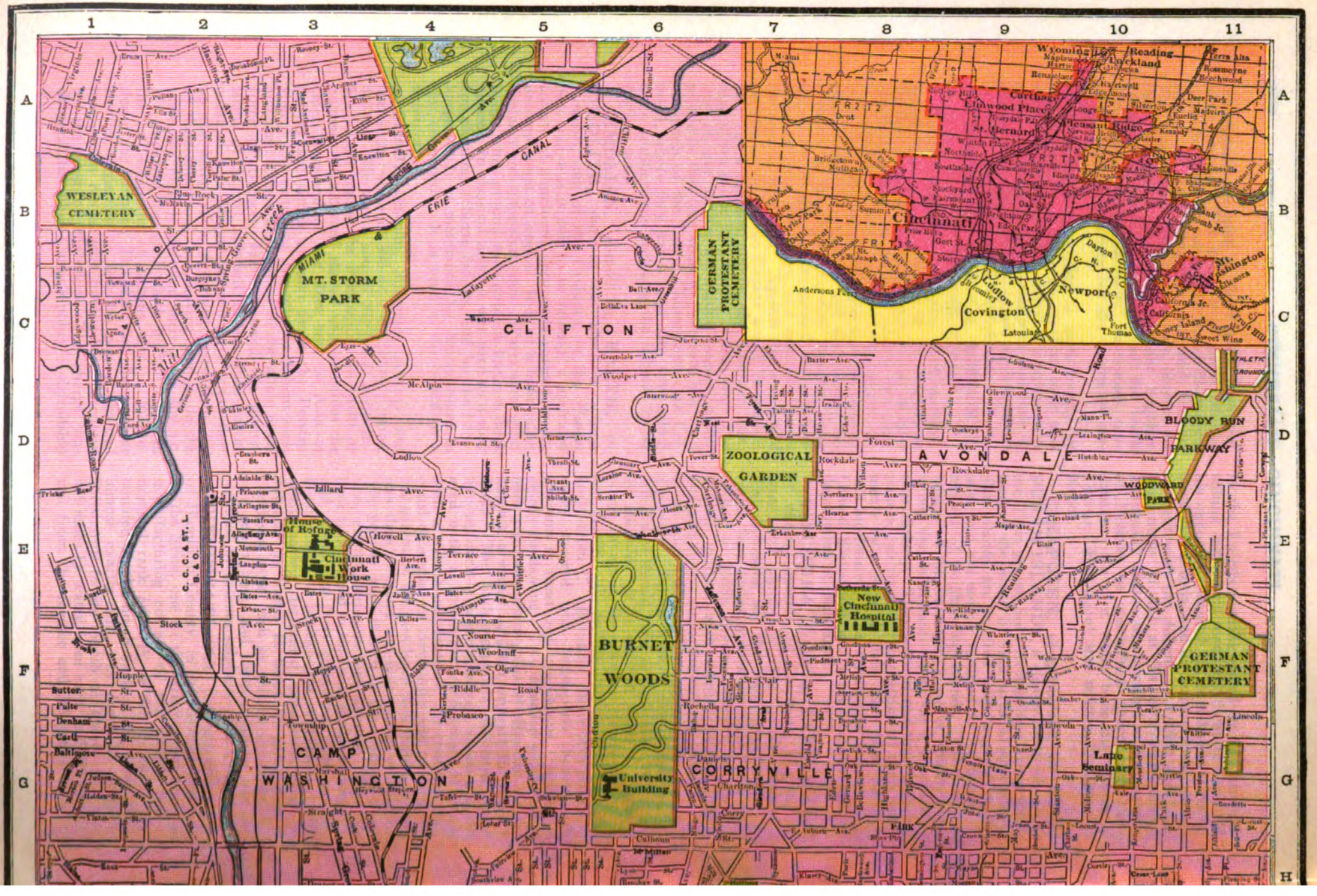
CIMOLIAN, EARTH, or CIMOLITE, sĭm'ō-lĭt or kĭm'ō-lĭt (from Kimolos, one of the Cyclades, in the Ægean Sea, where it is still to be found), a hydrated silicate of aluminum, apparently formed by the decomposition of augite. It is of a light color, compact and somewhat slaty. Water soon splits it up; when ground with water it forms a thick cream. In classical times it was used as a soap for cleaning delicate fabrics, and by the bath-keepers. It is mentioned by Aristophanes in this connection. It is used in the island as a detergent.

CIMON, kī-mŏn, Athenian general and statesman: b. about 502 B.C.; d. Citium, Cyprus, 449 B.C. He was a son of the great Miltiades. He fought against the Persians in the battle of Salamis 480 B.C., and shared with Aristides the chief command of the fleet sent to Asia to deliver the Greek colonies from the Persian yoke. The return of Aristides to Athens soon after left Cimon at the head of the whole naval force of Greece. He conquered the pirate-island of Scyros, subdued all the cities on the coast of Asia Minor, pursued the Persian fleet up the Eurymedon, destroyed more than 200 of their ships, and then, having landed, on the same day entirely defeated their army 469 B.C. He employed the spoil which he had taken in the embellishment of Athens, and in 463 reduced the revolted Thasians; but the popular leaders, beginning to fear his power, charged him on his return with having been corrupted by the king of Macedon. The charge was dropped, but when Cimon's policy of friendship to the Lacedæmonians ended in the latter insulting the troops sent by Athens to their aid, his opponents secured his banishment. He retired into Bœotia, and his request to be allowed to fight with the Athenians against the Lacedæmonians in 457 at Tanagra was refused. Eventually Cimon was recalled at the instance of Pericles to conclude a peace with Lacedæmon. He died while besieging Citium in Cyprus. His 'Life' was written by Cornelius Nepos.

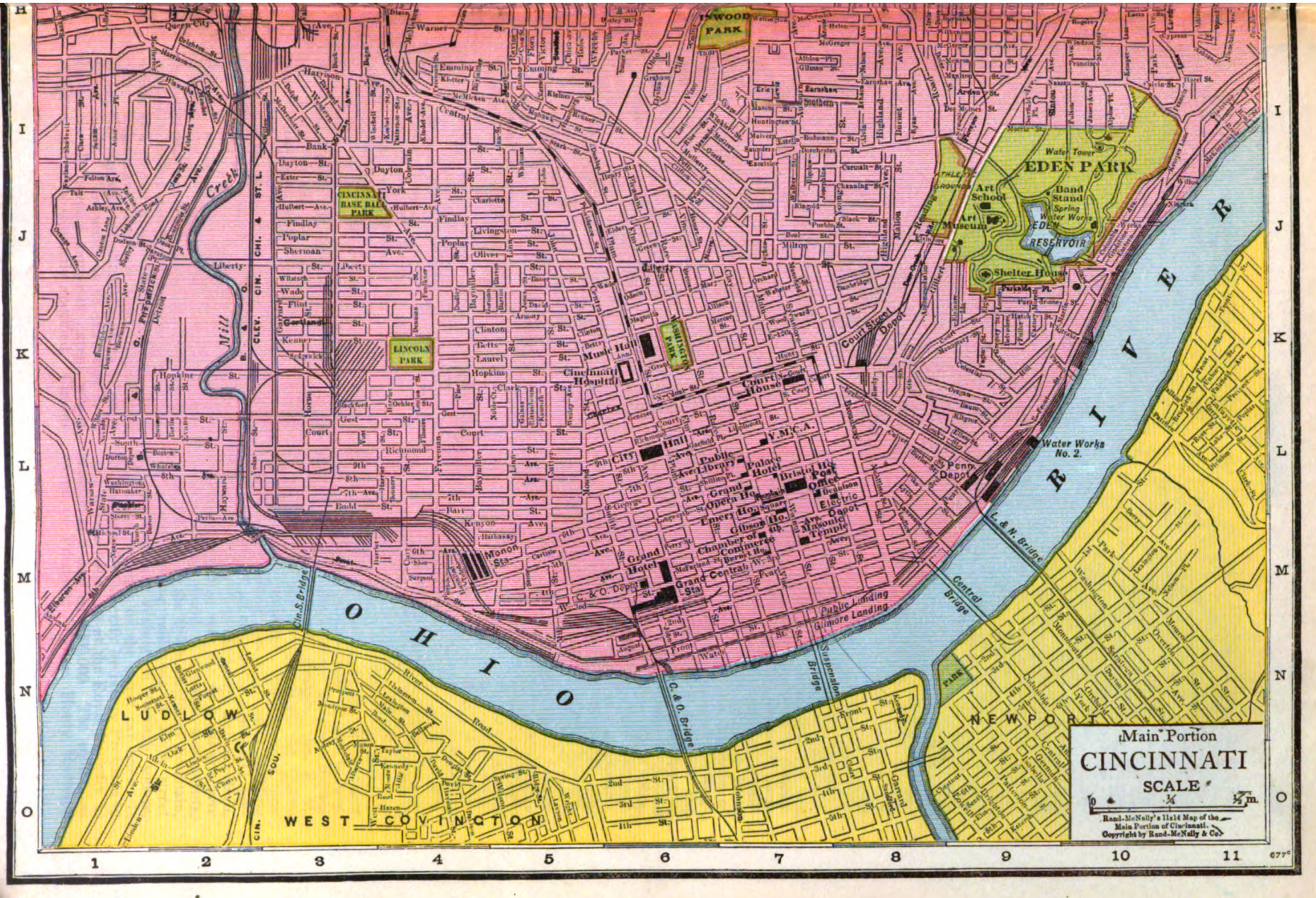
CINAPUSEN, sē-nä-poo'sän, or **CINAPURAN ISLANDS,** a cluster of 10 islands of the Tawi group, Sulu Archipelago, lying southwest of the island of Sulu; area, 13 square miles. The islands are covered with tropical vegetation, and are mostly resorted to for fishing by natives of neighboring islands. Tabawan, the largest of the cluster, is, however, thickly populated; the inhabitants carry on a considerable pearl fishery. They were at one time notorious pirates, but since the destruction of their settlements by a Spanish fleet, have been harmless and inoffensive. The islands now belong to the United States and are a part of the military department of Mindanao.

CINCHONA, sĭn-kō'nạ, **BARK,** the bark of several species of *Cinchona*, a genus of trees and shrubs of the family *Rubiaceæ*. The following are the most important: *Cinchona flava cortex*, yellow cinchona bark, which occurs as quills covered with a brown epidermis, mottled with whitish yellow lichens, and also in flat cinnamon-colored pieces. They break with a fibrous fracture and the escape of a powder. Yellow bark is rich in quinine, and 100 grains should yield not less than two grains of alkaloid. It is derived from *C. calisaya*, which grows in the peculiar cloudy regions of the Andes. *C. pallida cortex*, pale cinchona bark, from *C. officinalis*. It occurs always in quills covered with crustaceous lichens. Its fracture is short and not fibrous. It contains chiefly cinchonine. Two hundred grains of the bark yield about one grain of alkaloid. *C. succirubra*, a native of Peru, appears to thrive in India. The bark occurs in flattened rough-fibrous, dark-brown red pieces, which are covered with a brown-red epidermis. It breaks with a red fibrous fracture. It contains about equal quantities of cinchonine and quinine, and 100 grains of the powdered bark should yield not less than one and one-half grains of alkaloid. The yellow bark is used in the form of decoction, extract, infusion and tincture. The pale bark is contained in *tincture cinchonæ composita* and in *mixtura ferri aromatica*. The cinchona barks contain, besides the alkaloids, certain acids having astringent properties, and are valuable as tonics in cases of great debility. Cinchona barks rich in quinine generally contain much lime, and their solutions are precipitated by sodium sulphate. See QUININE.

CINCINNATI, Ohio, city and county-seat of Hamilton County, in the extreme southwest of the State, one of the great commercial and manufacturing centres of the Union, 10th in nominal rank and 7th or 8th in fact. It is situated on the north bank of the Ohio River, almost exactly half way from its origin at Pittsburgh to its mouth at Cairo, Ill., about 465 miles by water from each, and 315 miles by rail from the former and 369 miles from the



WESLEYAN CEMETERY
MT. STORM PARK
MIAMI & ERIE CANAL
CLIFTON
GERMAN PROTESTANT CEMETERY
ZOOLOGICAL GARDEN
AVONDALE
BLOODY RUN PARKWAY
WOODWARD PARK
ATHLETIC GROUNDS
House of Refuge
Cincinnati Work House
C. C. C. & ST. L. B. & O.
BURNET WOODS
New Cincinnati Hospital
University Building
CAMP WASHINGTON
CORRYVILLE
GERMAN PROTESTANT CEMETERY
Lane Seminary
Cincinnati
Covington
Newport
Ludlow
Wyoming
Reading
Lockland
Carthage
Elmwood Place
St. Bernard
Pleasant Ridge
Mt. Washington
Andersons Ferry
Fort Thomas
Latonia
Dayton
Mill Creek
Spring Grove Ave.
Lafayette Ave.
McAlpin Ave.
Woolper Ave.
Ludlow
Lillard Ave.
Howell Ave.
Terrace
Anderson
Nourse
Woodruff
Olga
Riddle Road
Probasco
Stock
Hopple
Township
Sutter
Palte
Denham
Carll
Baltimore
Straight
Calhoun
Corry
Rockdale
Forest
Glenwood
Lexington
Windham
Cleveland
Maple Ave.
Catherine St.
Hale
Whittier
Lincoln
Dayton
Fairmount
Bridgetown
Mulligan
Summit
Price Hill
Gest St.
Stockyard
Lincoln
Ferry
Fork


Main Portion
CINCINNATI
SCALE
0 ¼ ½ m.
Rand-McNally's 11x14 Map of the Main Portion of Cincinnati.
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OHIO RIVER
EDEN PARK
Water Tower
Band Stand
Spring Water Works
EDEN RESERVOIR
Art School
Art Museum
Shelter House
Water Works No. 2.
Penn. Depot
Court Street Depot
Court House
Music Hall
Cincinnati Hospital
City Hall
Public Library
Palace Hotel
Bristol Ho.
Post Office
Grand Opera Ho.
Emery Ho.
Gibson Ho.
Chamber of Commerce
Masonic Temple
Electric Depot
Grand Hotel
Grand Central Sta.
Monon Sta.
C. & O. Depot
Public Landing
Gilmore Landing
Suspension Bridge
Central Bridge
L. & N. Bridge
C. & O. Bridge
Cin. S. Bridge
Mill Creek
INWOOD PARK
WASHINGTON PARK
LINCOLN PARK
CINCINNATI BASE BALL PARK
LUDLOW
WEST COVINGTON
NEWPORT
PARK
677

latter; and is a terminal of every trunk line of railroad in the Middle West, being the main terminal of the Cincinnati Southern, Cincinnati, Hamilton and Dayton, Chesapeake and Ohio and a number of others. It is 138 miles by water from Louisville and 1,631 miles from New Orleans against 114 miles and 1,210 miles respectively by rail; 764 miles by rail from New York and 270 miles from Chicago.

Topography.—Cincinnati occupies the northern half of a circular amphitheatre of hills about two and a half miles in diameter bisected east and west by the Ohio River—which here makes a great southward sweep. The southern half is bisected north and south by the Licking River with its Kentucky suburbs, respectable cities themselves. The northern semi-circle rises from the river in two great terraces sloping northward to a third level at the summit, originally quite distinct, now much confused by grading. The lower platform is a bluff about 65 feet above low water, the second 50 to 100 feet higher. The crest hills, 15 to 300 feet higher yet, are about 475 feet at the summits—Mount Adams, Price Hill, Mount Lookout, Mount Auburn, Fairview Heights, etc.—giving a noble prospect of river and country. Three of these hills can be reached by inclined plane cable railways, used in the main for lifting of electrical cars. These hills are cut by ravines, the heavy original woods having been replaced by miles of the finest residence streets in America, parked with shrubbery, lawns and flower gardens. On the western side of the city from north to south runs Mill Creek, the remains of a once huge glacial stream whose gently sloping valley, one-half mile or more wide, forms an easy path into the heart of the city and was an indispensable factor in determining its position. Highways, canals and railroads come through it and the city's growth has pushed much farther up this valley than in other directions. The railroad stockyards are on its eastern slope. Cincinnati extends for about 30 miles along the river front to a width of about 15 miles in an irregular block north from it. The total area thus far in the city limits is 72 square miles, much more being legitimately a part of it. Cincinnati owns a strip of land 100 feet wide and 335 miles long directly south to Chattanooga, Tenn., upon which is built the city-owned Cincinnati Southern Railroad.

Municipal Conditions.—The site of the city is a glacial moraine of gravel and boulders cut through by the Ohio River. There is therefore little bottom land and there has been from the first none of the malaria which was long such a scourge and reproach to Western settlements; and this with the moderate climate averaging about 75 degrees in summer and 30 or 40 degrees in winter and the easy sewerage down the slopes into the Ohio and away from the city has given it excellent sanitary conditions. Its death rate fell from 21 per 1,000 in 1890, to 15.6 per 1,000 in 1915. The city owns its waterworks and 712 miles of mains. In recent years it has completed a municipal waterworks at a cost of $12,000,000, including a complete magnificent filtration plant which furnishes the city with 128,000,000 gallons of pure water daily. This water is so pure that it is used for all hospital purposes except where distilled water is distinctly specified. Cincinnati has 960 miles of streets and alleys (608 miles improved); and 463.6 miles of sewers. It owns property worth $126,000,000 and has an assessed property valuation of $706,613,000.

Interior, Suburbs, etc.—The bottom level below the bluffs, along the river seat, is the site of the river shipping business, and has the usual fringe of low quarters. It is paved and there is a broad public landing fronted by floating docks, wharf boats, etc. Above are the wholesale and then the retail business streets with great extent and variety of fine business architecture and girt around with electric roads of which there are some 227 miles within the city limits. The principal lines converge at or near Fountain Square and connect with a ring of suburbs within and without the city limits, unsurpassed in America. To the north are Clifton, Avondale, Mount Auburn, Vernonville, College Hill, Winton Place, Linwood, Elmwood, Hartwell, Lockland, Glendale, Norwood, Oakley, Walnut Hills, Mount Lookout, etc. Across the river, over which on three bridges the electric lines run, are numerous cities and towns, including Covington, Ludlow and Milldale to the west of the Licking, and Newport, Bellevue, Dayton and Fort Thomas to the east. These are in the State of Kentucky, but are included in Cincinnati's metropolitan district. The river is crossed by five bridges, each more than half a mile long, one exclusively for railway traffic, two for highway and two for both. The truss-bridge of the Cincinnati Southern to Ludlow—costing $3,348,675, is one of the longest spans in the world; there are also the cantilever designed by John A. Roebling and completed at a cost of $1,800,000; and two wrought iron bridges to Newport, one of them used by the Louisville and Nashville Railroad.

The original town was laid out as a checkerboard, with streets four rods wide, the conventional form of the artificial American town; but the irregular surface and individual tastes have given them greater variety since, and no city has a finer field for picturesque architecture. A local freestone and blue limestone are much used in building as well as brick with steel framing. The most notable public buildings besides churches noted below are the government building (post-office, custom-house, etc.), of brick and iron with freestone facing, 180 feet by 50 feet, costing $5,200,000; the new county courthouse, costing $2,500,000, erected in 1916; the Cincinnati General Hospital, a group of 29 buildings, costing $4,000,000; the magnificent Music Hall, the gift of Reuben R. Springer and others; the Romanesque public library, costing $675,000; the Masonic Temple (Byzantine); the Odd Fellows' Temple; the Y. M. C. A. building, the Art Museum, the Queen City Club, Bell Telephone building, the Union Central Life building, the tallest office building outside of New York city, and a number of skyscrapers of from 15 to 20 stories, one of which, the Ingalls building, was the first tall concrete structure in the world. Of public monuments, the most artistic is the Tyler Davidson Fountain, with a surrounding esplanade on Fifth street between Vine and Walnut on Fountain square, the centre of most of the street car lines. It was presented to the city by Henry Probasco in 1871, having been cast at the Royal Foundry at Munich at a cost of $200,000. The equestrian statue of President William Henry Harrison

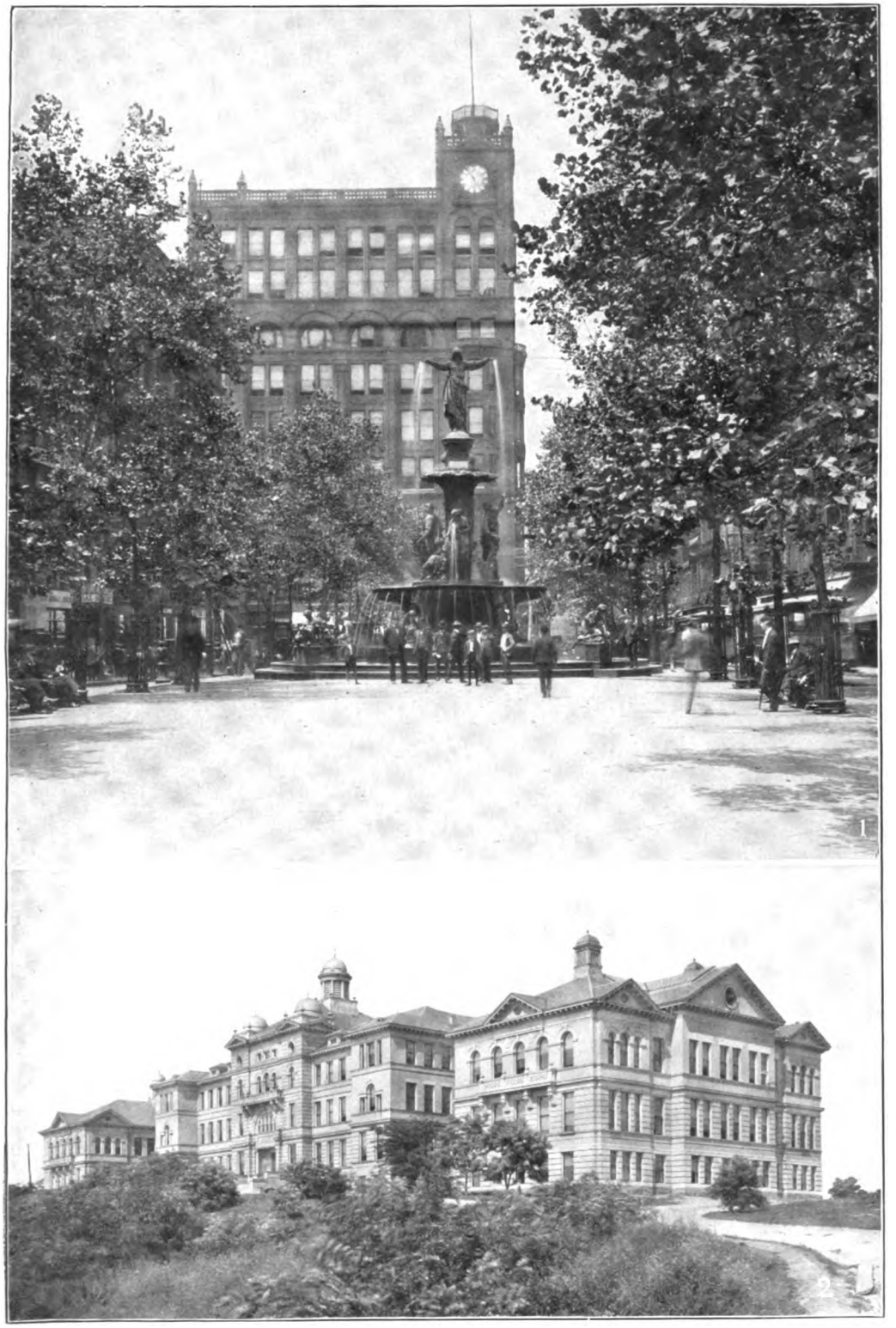
(first governor of Ohio), the statues of Garfield, Lincoln, Ecker and McCook, and the Fort Washington monument also adorn the city.

Parks, Cemeteries, etc.— The park system comprises 2,550 acres in three large bodies on the hills and many smaller ones. The largest is the superb Mount Airy Forest, containing 943 acres. The second is Eden Park, formerly called the Garden of Eden. It is situated on Mount Adams, in the northeast centre, containing the two main city reservoirs made to look like lovely natural lakes; there is also a water tower with steps to the top commanding a matchless prospect. The Art Museum and Art School, two beautiful buildings costing $450,000, are within the grounds, which are entered by a mediæval gateway, Elsinore, much admired. The next largest and an equally picturesque park is Burnet Woods, containing 160 acres. It contains the grounds of the University of Cincinnati. The Cincinnati Zoological Gardens (q.v.), northeast of Burnet Woods, comprise 60 acres of wild natural beauty, and contain a varied collection of wild animals and birds. McFarland Woods, Owl's Nest Park, Mount Echo Park and Ault Park, together with Lincoln, Washington and Hopkins, are the finest of the smaller parks. Most of the 20 cemeteries are in the northeast, although one or two are in the extreme southwest, but the one superb burial ground, one of the largest and most charming in the country, is Spring Grove Cemetery, about six miles north on the western slope of Millcreek Valley, with 600 acres of fine landscape gardening and native beauty, and reached by an avenue 100 feet wide. It has a bronze statue as a soldiers' monument, and many magnificent and costly mausoleums.

Amusements, Clubs, etc.— Music is cultivated in a number of well-patronized institutions, including the Conservatory, the College of Music and various smaller conservatories. The biennial May festivals are an indispensable part of the city's higher life and are known throughout the world. Other important features of the musical life are the permanent Symphony Orchestra, which was endowed in 1915 for $1,000,000 by the late Cora M. Dow; the Orpheus Club and a large number of German singing societies. The grand Music Hall is a monument of the munificence of Reuben Springer, who founded it and gave it part of its endowment. It is 500 feet by 300 feet, has a seating capacity of 3,600, and its organ is one of the largest in the country. There are also the Grand, Lyric, Walnut, Keith's, Peoples' and Olympic theatres, over 100 motion picture houses, the Emery Auditorium and many halls where people congregate for entertainments of various sorts. The chief clubs are the Queen City, Business Men's Club, Phœnix, Cincinnati, Cuview Press, Country, Literary, Woman's Women's City Club, Business Woman's, the City Club, Rotary Club, Advertiser's Club, Ben Franklin Club, and the Trade Expansion Club. The Cincinnati Gymnasium has extensive suburban athletic grounds and owns a fine city building. There are two favorite summer resorts on the Ohio River, one on the Kentucky shore called the Lagoon, and Coney Island some miles up the river. Chester Park, near Spring Grove Cemetery, is one of the best equipped amusement resorts in the Middle West.

Business Interests.— The position of Cincinnati as a midway port on the great central channel of one of the most fertile districts of the world, added to its location on a platform above the floods which washed away its rivals, was the origin of its greatness; but that river traffic has greatly declined since the advent of railroads. Even yet, however, it is invaluable for the transportation of bulky freight — coal, ore, iron, lumber, salt, etc.— to manufactories and the distribution of its products to the Ohio and Mississippi ports as far as New Orleans, up the Ohio to Pittsburgh, to the Big Sandy, Cumberland, Tennessee and Green, Red, White, Arkansas, Yazoo, etc., covering 1,200 miles of the Ohio, 850 of the Mississippi, and 2,000 of tributaries. About 100 vessels a year register for this inland commerce, with a tonnage of some 8,000; but there is a much greater commerce than this indicates, as one towboat will push many barges in front of it, a method peculiar to Western rivers. The government improvements, dredging and lighting the channel, have greatly aided to keep this navigation alive. The immense railroad business has already been referred to. Seventeen roads enter Cincinnati; the passengers of most of them come into the Central Union Depot at Central avenue and Third street; but a few, of which the Pennsylvania is chief, have separate stations. The Cincinnati Southern road, 338 miles long, was built and is still owned by the city, and is operated by the Southern Railway Company. under lease. The business interests of the community revolve around the Cincinnati Chamber of Commerce, an organization of business and professional men, totaling 4,000, which conducts by means of a large income a thoroughly departmentalized organization, the principal departments of which are devoted to conventions and publicity, weighing and inspection, statistics, grain and hay, exchange, produce exchange, civic and industrial work, traffic, merchandising and foreign trade.

The trade and manufacturing interests of the city are large and important. It has many national banks, clearings aggregating $2,030,-181,819 in 1917. It has also a large number of State and private banks, building and loan associations, many strong trust companies and savings banks. Slaughtering and packing of meats, especially pork, has been long and is still one of the leading branches of commerce, the city packing more than one-half of the produce of the State. Cincinnati holds the first position in the country in the manufacture and sale, both domestic and foreign, of machine tools and machinery. The number of industrial establishments is about 4,000, with a capital of about $212,500,000, and 100,000 workmen, and occupying real estate valued at $100,000,000, with an annual factory output of nearly $300,000,000. According to the last census the greatest single branch is iron work, including pig, castings, foundry and machine shop products and architectural iron work; men's clothing, slaughtering and packing of meats, distilled liquors, factory made boots and shoes, carriages and their material, tobacco products and malt liquors. Other great products are leather and leather goods, furniture, lumber, timber and woodworking products; coffee and spices, roasted and ground; saddlery and harness; pickles and preserves; undertakers' goods;



1 Fountain Square: Tyler-Davidson Fountain

2 University of Cincinnati Buildings

musical instruments; soap and candles; electrical supplies; flour and grist; plumbers' supplies; patent medicines; and society regalia, costumes, banners, etc., in which Cincinnati heads the United States. Other products number hundreds, many curious and interesting, notably those of the Rookwood Pottery.

Educational Institutions, Libraries, Newspapers, etc.— Cincinnati has a thorough system of public schools with 59 day elementary, 10 special, 2 night high, 6 night elementary, 6 public high schools and about 1,725 teachers; besides private academies and secondary schools including 51 Catholic parochial schools. For higher education the chief is the University of Cincinnati, the only municipal university in the United States, operated as part of the public school system, expanded from the old McMicken University, the capstone of the system of public instruction, with affiliated medical, and dental and law departments, and in connection the famous observatory now located on Mount Lookout — one of the earliest in the United States, with a 16-inch refractor and a new meridian circle, and with a notable record in the investigation of double stars. The university buildings are in a 30-acre space set off by the city in Burnet Woods Park. The Ohio Mechanics' Institute, one of the most important educational forces in the city, has a large, thoroughly equipped building and library, and maintains both daily, and night schools, attended by hundreds, in which regular classical, literary and scientific instruction and courses of lectures are given. There are also medical and surgical schools, besides training schools for nurses in the hospitals; two other dental colleges; a night law school; several business colleges and schools of expression; Lane Theological Seminary at Walnut Hills (1832) famous for Lyman Beecher and Calvin E. Stowe, and for its slavery dissensions, two Roman Catholic colleges, Saint Francis Xavier (1840) and Saint Joseph's (1873); five Catholic seminaries for the education of priests and six Catholic female academies and seminaries, leading to others, the Hebrew Union College (Reformed Jewish) for educating rabbis, the chief one in the United States; the Art Museum and Art School founded by Cincinnati ladies on the model of South Kensington, London, with two large buildings and several hundred students, and a valuable collection of works of art. The Cincinnati Society of Natural History has a museum of valuable and interesting relics open to the public. Of the libraries, the chief is the free Public Library, handsomely housed on Vine street (with over 490,000 volumes and pamphlets) and 23 branches and 26 stations. There are 16 others, subscription and institutional, of which the chief are the Young Men's Mercantile, the Law Library, that of the Mechanics' Institute, the library of Saint Xavier's College, Lloyd Library and Museum, the University Library, and the Historical and Philosophical Society has the finest collection in existence of original manuscripts, pamphlets and bound volumes pertaining to the history of Cincinnati and the State of Ohio, and ranks among the first institutions of the kind in the country. The city supports some 20 daily newspapers — English, German and Italian; over 80 weeklies, English and German; over 100 monthlies and quarterlies, besides a number of special publications.

Churches and Charities.— Cincinnati has about 270 church bodies, 56 Roman Catholic (besides 5 convents), 219 Protestant of various denominations, 12 Jewish synagogues and 38 unclassified, including Christian Science, Spiritualist, etc. The city is the seat of a Roman Catholic archbishop and a Protestant Episcopal bishop, with cathedrals of both. The finest church building in Cincinnati is the cathedral of Saint Peter in pure Grecian style, 180 feet by 60 and 90, with a spire 224 feet high, and its priceless altar-piece Murillo's original "St. Peter Delivered." Other prominent churches are the First Presbyterian, with a tower and spire 285 feet high, the loftiest in the West; the Second Presbyterian; Saint Francis Xavier and the Saint Francis de Sales (Roman Catholic), Christ's and Saint Paul's Protestant Episcopal and Saint Paul's Methodist Episcopal, the Ninth Street Baptist, Unitarian, New Thought Temple and the church of the New Jerusalem (Swedenborgian). There are 61 benevolent associations in the city covering every class and grade of alleviable human misfortune, and an infirmary, a workhouse, with workshops and workgrounds. Prominent among 17 hospitals, public and private, are the Cincinnati General, Jewish, Good Samaritan, Longview Insane Asylum, Bethesda, Ohio Hospital for Women and Children, the Presbyterian, Elizabeth Gamble, Deaconess Home, Christ, and the Branch Hospital (the first tuberculosis hospital established in America for the scientific treatment of tubercular subjects). There are also numerous homes for the aged and infirm, for orphans, for incurables and the friendless, non-sectarian and denominational, all splendidly equipped, and a fresh air fund and farm.

Government, Finances, etc.— The government is a modified federal form, there is a four-year mayor, who appoints directors of public service and safety, a legislative council of one from each ward with four elected at large and a board of education elected by the people. The city debt is about $55,000,000, but $27,000,000 of this is for the Cincinnati Southern Railroad which returns $1,000,000 per year rental. The tax rate is $15.46 per thousand dollars. The yearly disbursements are about $14,457,725, of which over $2,500,000 is for schools.

Population.— In 1800, 750; (1810) 2,540; (1820) 9,642; (1830) 24,831; (1840) 42,338; (1850) 115,435; (1860) 161,044; (1870) 216,239; (1880) 255,139; (1890) 296,908; (1900) 325,902; (1910) 363,591; (1914) 402,000. The census bureau estimate for 1915 was 406,706. This is inaccurate, however, without supplemental figures based on the population of the city with nearly one-third of its business population residing across the river in another State, as well as several populous suburbs in other townships to the north, Newport, Bellevue and Dayton, Ky., east of the Licking, Covington and Ludlow, west of it, Millcreek, Columbia and Delhi and Norwood on the north adding about 200,000 to the population above stated. About 79 per cent of Cincinnati people are native white Americans, a greater proportion than any other large city in the United States. The foreign-born population is 15.6 per cent of the total. Male aliens over 21 years of age form only 2.6 per cent of the population. Negro

population is but 5.4 per cent of the total; 78 per cent of the foreign-born population is made up of English, Irish and Germans; 10.3 per cent of the foreign-born population is made up of Russians, Italians and Hungarians.

History.— The site of Cincinnati at the time it first came under the eye of the white man was covered with "ancient works," monuments of a prehistoric race. Traces of many of these "works" still abound in the neighborhood, which is a centre of the so-called "Mound Builders" remains. Here, too, ran the old Indian trail leading from the British trading post at Detroit to the Licking River, and into the section south of the Ohio. Numerous bands of savages swept through the valley of the Miamis, subsequently called the "Miami Slaughter House," on their marauding expeditions against the Kentucky pioneers. It was in pursuing one of these bands of "Horse Thieves" that Benjamin Stites first noticed the fertility of the section and its desirability for settlement. As a result of his efforts came the "Miami Purchase."

John Cleves Symmes, with other members of Congress who had been interested by Stites, in 1787 began negotiations with the government for the land lying between the Miamis, which resulted in a conditional purchase that on survey proved to be some 600,000 acres, of which he ultimately received about half. Early in 1788 he sold 740 acres opposite the mouth of the Licking to Matthias Benman and others, with whom he visited the spot later and selected it as the site for a city, to be called Losantiville — a combination of Latin and French, meaning "Town opposite the mouth of the Licking." After some shiftings of ownership a firm consisting of Israel Ludlow, a surveyor, and two others took possession 28 Dec. 1788, and Ludlow laid out a village with the present Central avenue and Broadway, about three-quarters of a mile apart, for east and west boundaries, and Seventh street, about as far from the river, for northern, blazing the street lines on the trees. Three or four log cabins were built, and the flooding out of several Ohio River town sites about this time left Cincinnati the chief survivor. The building of Fort Washington by the government in the summer of 1789, just east of Broadway, still further confirmed its primacy, for the Indians were a terrible menace until long after. In January 1790 Gen. Arthur St. Clair, newly-appointed governor of Northwest Territory, arrived, laid out Hamilton County (named after Alexander Hamilton), and made its seat the new town, whose name he changed to Cincinnati (Symmes who professes to have suggested the change, was tenacious for Cincinnata), after the famous society of Revolutionary officers, of which he was a member. By the end of 1790, it had some 40 log houses. The defeats of Harmar (1790) and St. Clair (1791) nearly caused its abandonment in a panic, but the importance of the fort kept the settlement alive. In 1792 as many as 354 lots had been taken for building; and so important a centre of commerce had it become even then that 34 of its buildings were warehouses well stocked with goods. It had some 900 inhabitants, but many of them were floaters. A visiting missionary reported that the people resembled those of Sodom, and the town, like others on the north bank of the Ohio, was thronged with frontier idlers and lawless ruffians, who took refuge in Kentucky when brought to book; but as the first church (Presbyterian) was built this year, and the first school (pay) opened with 30 scholars, perhaps some of this language was "common form." Also as settlers were compelled by law to take their loaded guns to church for protection against Indians, it was no place for the tamer sort. In 1793, the *Sentinel of the Northwest Territory*, the first newspaper published north of the Ohio, appeared, and a year later the first through mail to Pittsburgh was started in a canoe, and a packet line of keel boats to Pittsburgh was organized. Wayne's crushing defeat of the savages at Fallen Timbers, bringing peace to the frontier, was in one sense disastrous to Fort Washington, as settlers swarmed all over Ohio, and it ceased to be the one centre. This defeat, however, assured the permanency of Cincinnati, which increased slowly but surely until in 1800 its population was 750, a growth of 50 per cent since 1795. In December 1801 the seat of territorial government was removed to Chillicothe. But its 12 years' primacy, the army post making it a depot for supplies, and its frontier position, had given it a safe start. In 1802 Cincinnati was incorporated as a town. A well-known picture of the town also dates from this year, in which, too, a "Young Ladies' School" was started, indicating a superior grade of population, and from February to May 1802 over 4,400 barrels of flour were exported, showing its development as a distributing port. The first bank, that of the Miami Exporting Company, was started in 1803. In 1805 the town had 960 people and 172 buildings. But immigration set in much more strongly a year later, and the names show an extraordinary intellectual calibre, in the settlers it was attracting. In 1810 it had 2,300 inhabitants, and was the largest town in the State, the centre of immigration to Ohio, and with a great commerce along the river, and was contemplating a university. The first book descriptive of the place appeared this year written by the celebrated Dr. Drake. In October 1811 the steamboat *New Orleans* passed the town on her first trip from Pittsburgh to Louisville. A stone steam mill 110 feet high of nine stories and with foundation walls 10 feet thick dates from 1812. In 1814 Lancaster Academy, afterward Cincinnati College, was founded. In 1819 the town received a city charter, having according to the first directory, published this year, 9,873 inhabitants, mostly from the Northern and Middle States, but also many foreigners, so that it was "not uncommon to hear three or four languages spoken in the streets." Another little book descriptive of the city published in 1826 was republished in England and translated into German, circulated on the Continent and attracted a large number of immigrants, especially Germans, who by 1840 numbered one-fourth of the population. But its great development came with the opening of the Miami Canal, the most important single influence in the history of the city, for which ground was broken in 1825 at Middletown, and which was completed to Cincinnati in 1827. This not only developed commerce but furnished great water power for manufacturing. The first railroad, the Little Miami, was chartered in 1836, but was not opened until 1846, the first section not until 1843. Even before this the growth was very rapid, population nearly trebling 1820–30,

and doubling 1830–40, but the next decade showed the tremendous leap from 46,000 to 115,000. From 1840 the immense immigration of Germans increased so rapidly as to make it for years the typical German city. The Germans took great interest in grape culture and the city for some years was a great wine market. It was the great German population that caused the first Saengerfest of the North American Saengerbund to be held here in 1849, a great stimulus to the musical activity of the city since so famed in the musical world. Several times the city was fearfully ravaged by the cholera, beginning with 1832–34; in 1849 and 1850 over 9,000 souls, nearly 8 per cent of the entire population, perished of it. Yellow fever came in 1878. Floods have also risen over its platform several times and laid the lower section under water; those of 1832 (the year of flood, fire, pestilence and famine), of 1883, 1884, having been especially high and destructive. In 1838 the new and beautiful steamer *Moselle* exploded in front of the landing with a loss of almost 140 lives, one of the most terrible river disasters of the century. Two years later the city was the centre of the "log cabin" campaign, which sent a favorite son, William Henry Harrison, to the White House. At a later time Hayes, whose previous active life had been spent in this city, occupied the presidential position, and Salmon P. Chase, another famous Cincinnatian, was chief justice of the United States. A continuous excitement of the city was its fury over the race question and later the abolition movement. The vast Northern interest in Southern trade was everywhere a powerful restraining influence on this; but Cincinnati, on the border, and with its daily bread dependent on this trade, besides having a considerable percentage of its people of Southern birth and detesting the movement on general principles, felt menaced with entire industrial ruin, if the agitation were not put down by force. Lane Seminary was threatened with fire, and its faculty with lynching, if the students were not prohibited from discussing slavery; and in 1836 and 1841 James G. Birney's philanthropist press was wrecked by the mob. In fact anti-negro riots were frequent and arose upon the slightest provocation. The trouble was later aggravated by the fact that Cincinnati, being a border city, was a chief station on the "underground railroad"; one Quaker citizen boasted of aiding 3,000 fugitive slaves to escape, and in all several times that number must have been smuggled across. Here, too, were tried the celebrated "fugitive slave cases," the Rosetta and Margaret Garner cases. In 1856 Buchanan was nominated for the presidency; later nominees of Cincinnati conventions were Greeley, in 1872, Hayes, in 1876, and Hancock, in 1880. When the war broke out, however, it became a strong Union city, and its record is noble. In 1862 the fear of an assault by the Confederate, Kirby Smith, caused the city to be put under martial law for a while; a somewhat similar experience came in 1863, at the time of the John Morgan raid. Another war incident was the Vallandingham case. Cincinnati sent its citizen, George B. McClellan, to command the armies of the North. The decade prior to the war had not been one of great progress, but in spite of the decay of trade with the South, the city leaped forward with the resumption of peace. The desire to renew the relations with its old business associates induced it to enter upon the construction of the Cincinnati Southern Railway to Chattanooga, which was built by the city itself, an extreme instance of municipal ownership. The celebrated "Bible" case in 1869 resulted in the abolition of religious instruction from the public schools and gave national fame to the bar that included such lawyers as those who argued the case. In 1869 began a series of annexations, which in a few years increased the city's area from 7 square miles (3 miles when incorporated in 1819) to 24 square miles. Annexations in 1895 and 1903–04, 1912–13–14 and –15 brought the area to 72 square miles. The most notorious event in its later history is the "Cincinnati Riot" of 28–31 March 1884. As usual in modern times, the law had protected the criminal against the community till the criminal law was felt to be a farce; some murderers had received absurdly light sentences, and the patience of the lower orders gave way; they attempted to break into the jail and lynch the prisoners; foiled in this, they assaulted the courthouse, and burned it, as well as its records and other buildings adjoining; the State militia had to be called in, and in the fray that ensued 45 persons were killed and 145 wounded. In 1888 the centenary of the settlement of the State and city was celebrated by a Centennial Exposition of the Ohio Valley, the culmination of a series of industrial expositions that had attracted the attention of the country and given a director-general to the Centennial at Philadelphia in 1876.

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THOMAS QUINLAN,
Cincinnati Chamber of Commerce.

CINCINNATI, Society of the (as having left the plow, like Cincinnatus, for their country's service, and returning to it when the need was over), a memorial society organized by the officers of the American Revolutionary army, 13 May 1783, just before their final dispersion, from the camp on the Hudson near Fishkill. The first meeting was in the Verplanck House, Steuben's headquarters. A society was organized for each State, besides the general society of which Washington was elected president. Membership was confined to officers of the Continental army who had served with honor three years, or been honorably discharged for disability, whether native or foreign, and to their direct male descendants in order of birth, through females in default of males, and then to collaterals if judged acceptable to the Society. Partly as including several European nobles (Lafayette, Steuben, etc.), this was considered the beginning of an aristo-

cratic order on European models, obnoxious to popular liberties. Of course it could only become such by government recognition, but the principle of heredity is *per se* un-American. With more show of reason, it was regarded as a military conspiracy to appropriate all the offices under the new government; a sign that the officers did not intend to be Cincinnatuses if they could help it. It was regarded by high and low as a grave public danger; and all the Revolutionary chiefs who had not been in the army, and were ineligible,— Franklin, Adams, Jefferson, etc.— distrusted its possibilities if not its motives. The legislatures of Massachusetts, Rhode Island and Pennsylvania adopted resolutions censuring it as dangerous to the liberty and safety of the country; the governor of South Carolina denounced it in his message to the legislature; and the Irish chief justice of the same State, Ædanus Burke, wrote a pamphlet signed "Cassius," proving that it would subvert everything gained by the Revolution. This pamphlet was translated into French, and used by Mirabeau some years later. At the first general meeting, 7 May 1784, Washington persuaded them, in view of this public excitement, to abolish this hereditary feature. This, however, did not wholly conciliate popular feeling; and in 1789 the Tammany Society was founded in New York in avowed opposition, as a body where true equality should govern, and private advantage should not prevail over disinterested public spirit.

In 1787 Washington was elected president-general, and re-elected till his death; Alexander Hamilton succeeded him. Most of the State societies soon died, and the general society languished. When Lafayette visited this country in 1824 he was the only surviving major-general. The old hero's reappearance galvanized it into new life for a short time, but it sank out of sight again, and for many years was virtually dead, its chief function being an annual dinner in New York. Even a nominal organization was retained only in three or four States. The last survivor of the original association was Robert Burnet of New York, who died in 1854. In 1893 the general society began a successful effort to induce the States to revive or re-form their branches, and Connecticut first (1893) and Georgia last (1902) fill up the roll of the 13. Some of them issue publications.

The president-generals of the Society have been George Washington, Alexander Hamilton, Charles Cotesworth Pinckney, Thomas Pinckney, Aaron Ogden, Morgan Lewis, William Popham, H. A. S. Dearborn, Hamilton Fish, William Wayne and Winslow Warren.

The emblem of the Society, adopted at the outset, was a bald eagle suspended by a dark-blue ribbon with white borders, symbolizing the union of France and America. On the eagle's breast is Cincinnatus receiving a sword and other military insignia from the Senate; in the background, his wife stands at the door of their cottage, with the plow and other agricultural implements near; round the whole are the words, *Omnia reliquit servare rem publicam* ("He left all to serve the commonwealth"). On the reverse, Fame is crowning Cincinnatus with a wreath, inscribed *Virtutis Præmium;* in the background is a seaport city with gates opened and vessels entering; below are joined hands supporting a heart inscribed *Esto Perpetua* ("Be thou perpetual"). The living hereditary members number about 980.

CINCINNATI, University of. The University of Cincinnati owes its existence primarily to a bequest of Charles McMicken, who, in 1858, left $1,000,000 worth of property to the city of Cincinnati to found and maintain a college. One-half of this property consisting of real estate in the State of Louisiana was lost in 1860 by a decree of the Supreme Court of the United States, annulling that section of McMicken's will giving this property to the university on the ground that the testator could not bequeath real estate in Louisiana to a foreign corporation. The university receives support from the city to the extent of three-tenths of a mill on the total city tax. Other gifts have been utilized to contract buildings and to increase the endowment fund. The total value of the property and endowment was $3,200,000 in 1918. From 1858 to 1874 the income from McMicken's estate not being sufficient to support a college or university, the trustees decided to wait until a fund should accumulate or until additional support could be gained. Thus the present University of Cincinnati was not founded until 1874, although three departments of the university are much older, namely, the astronomical department, founded in 1842; the medical department, founded in 1819; the law department, founded in 1819 (Cincinnati College). Until 1899 the university was composed of the three departments above named, and also the academic which was founded in 1874. Since 1899 the following departments have been added: the College of Engineering, offering courses in civil, electrical, chemical, architectural and hydraulic engineering; the University Summer School; the University Library; the Teachers' College; the University Press; and the Technical School, which furnishes the shops to the engineering department and is an integral part of the Teachers' College, as also the College of Commerce. The dental department and the Clinical and Pathological School are only affiliated with the University of Cincinnati, having no financial or other connection with the University. No tuition is charged to residents of the city of Cincinnati who enter the university as students. The University of Cincinnati possesses a beautiful location in Burnet Woods Park, away from the noise and bustle of the city. Its government is by a board of directors appointed for six years by the mayor of Cincinnati. The intellectual life of the university finds expression in the publication of many memoirs, and monographs on literary and scientific subjects through the very important department of the university that has been recently established, namely, the University Press. These contributions to knowledge in the form of an annual volume of university bulletins are distributed by exchange all over the world. The total value of the scientific apparatus is about $190,000; the total number of volumes in the University Library, in addition to 80,000 pamphlets, is 88,100. The teaching corps numbers 271 and the students 2,922.

CINCINNATI ANTICLINE. In the period of disturbance which marked the close of Ordovician time in North America, the limestones deposited during the Trenton Epoch in

the interior sea that covered most of what is now the Mississippi Valley were forced up, on a line running through southern Ohio, Kentucky and Tennessee, in a low, broad arch. This arch is called the Cincinnati Anticline. It has been of much economic importance from its having contained great reservoirs of petroleum and natural gas, the latter now approaching exhaustion. See ORDOVICIAN SYSTEM; TRENTON STAGE.

CINCINNATI ZOOLOGICAL GARDENS, founded in Cincinnati, Ohio, by Mr. Andrew Erkenbrecher, were opened to the public 18 Sept. 1875. There existed in the city a society of acclimatization, and it was at a meeting of this body, 30 June 1873, that the matter of instituting a zoological park was first agitated, followed by the formation of an influential stock company. The gardens embrace 60 acres of ground diversified with valleys and undulating plains, covered with verdure and tree growth, about three miles from Fountain Square, the city centre, in a group of picturesque hills in a charming suburb. The collection of animals averages over 500 mammals, 1,200 birds and 125 reptiles, including fine specimens of lion, buffalo, polar bear, giraffe, zebu, elephant, python and alligator. The condition of the collection, the attractive buildings, fine structures of pleasing designs erected in iron and stone, the exceptional beauty and taste of the landscape gardening, the general arrangement of the grounds, the care displayed and success achieved with the animals and birds, rank this institution as second to none. Under good management it has become a self-sustaining as well as an excellent paying proposition without any detriment to its valuable educational advantages.

CINCINNATUS, Lucius Quinctius, a patrician belonging to the earliest period of the Roman republic: b. about 519 B.C. The legend which makes him the beau-ideal of the virtuous Roman is as follows: The Romans of his day were weakened by dissensions between the patricians and plebeians; the warlike Æquians, after making harassing incursions into their territory, succeeded at last in surrounding the Roman army under the consul Minucius in the wooded grounds of Mount Algidus. In despair the Roman senators went to Cincinnatus, offering him the dictatorship. The messengers found him at the plow. Reluctantly he accepted the office. He succeeded in rescuing the army from its perilous position, and marched to Rome laden with the spoils of victory. He then returned to his farm, whence he was again called, at the age of 80, to resume the dictatorship, to oppose the machinations of Spurius Mælius, and prevent a civil war between the upper and lower classes, which he succeeded in doing.

CINEMATOGRAPH, kĭn-ę-măt'ō-grăf (Gr. *κίνημα*, "movement," from *κινεῖν*, "to move"), an ingenious instrument introduced about 1895 by two brothers Lumière of Lyons, and founded on the same principle as Edison's kinetoscope — the persistence of vision. The characteristic part of the instrument is a sensitive photographic film or band about an inch and a quarter broad and from 50 feet long upwards, and which is exposed in a cinematograph camera. In this instrument the band passes from the drum on which it is wound around a series of compensating drums into position behind the camera lens. This lens is equipped with a shutter which opens 16 times in one second, remaining open usually about one one-hundredth of a second, although this time must be much reduced for quick movements like those of a trotting horse. During the time when the shutter is closed the film is pulled forward three-fourths of an inch, presenting a new surface for the succeeding exposure. The entire mechanism is worked by turning a crank-handle at the uniform rate of two turns per second. After exposure the film is developed by the tank method and wound for drying upon a large drum. In order to produce positives from these negatives a second sentitive film is exposed beneath it in a suitable apparatus and duly developed. If desired the positive may be conventionally colored by hand; the pictures are too small to be colored in detail. The cinematograph proper is a projecting lantern arranged to show the film pictures in rapid succession enlarged upon a screen. Besides the customary combination of the brilliant light and lenses which constitute a projecting lantern, the cinematograph is characterized by a delicately adjusted apparatus for advancing the film picture by picture in jerky fashion past the aperture behind the lenses at the rate of 16 per second, and a shutter which opens when the film is stationary and closes while it is moved onward. The periods while the shutter is closed are so brief that the eye fails to note it, the previous picture persisting upon the retina of the eye until the next picture appears on the screen. Upon the skill with which this delicate mechanism is regulated depends the steadiness, or freedom from flicker, of the view on the screen. Unfortunately the lenses which condense or concentrate the light used for projecting also condense the heat rays, and the film being of celluloid is quickly ignited if the winding reels pause when the shutter is open. Four or five seconds exposure to the concentrated rays is enough to start a conflagration, often with the most serious consequences. Recently several effective automatic fire prevention devices have been introduced and the newer cinematographs have this very necessary protection.

The moving mechanism for the film is operated generally by hand, as with the cinematograph camera, but in some machines a small electric motor is attached. However, the hand mechanism is much to be preferred if an expert operator is to be had, as he can gauge the speed by the actual effect on the screen and thus compensate for any deviations in the speed with which the original film was made.

The average length of the commercial exhibition cinematograph film is from 600 to 1,000 feet, requiring from 10 to 16 minutes for its presentation on the screen. Some extended subjects occupy three reels, or 3,000 feet, and require 50 minutes for a presentation. It is necessary to the smooth production of the motion picture on the screen that the individual pictures appear at the rate of 16 per second. It is not necessary, however, that the negative should have been exposed at the same rate. For instance, very interesting pictures showing the growth and blossoming of a plant have been produced by making the exposures at intervals longer or shorter — an hour, or even a day between. The film thus obtained in a

period stretching over months is shown in a few minutes on the screen, and the actual motion of the plant as it grows is witnessed by the audience. This latitude in the time within which a film may be exposed affords opportunity for the production of marvel or trick pictures, the camera being stopped while changes are made and started again to make such record as is desired. The continuous exhibition of the film presents the illusion that the picture presented was also a continuous event. Consult Bennett, C. N., 'The Handbook of Kinematography' (London 1911); Hopwood, H. V., 'Hopwood's Living Pictures' (London 1915); Hulfish, D. S., 'Motion Picture Work' (Chicago 1913); Jones, B. E., 'How to Make and Operate Moving Pictures' (New York 1916); Talbot, F. A., 'Practical Cinematography' (London 1913).

CINERARIA, a genus of plants of the family *Asteraceæ,* composed of about 25 species, natives of South Africa. The plants commonly in cultivation under this name were formerly placed in the genus *Cineraria* but are now generally referred to the vast genus *Senecio.* The cultivated forms have been derived from *Senecio cruentus,* native of the Canary Islands. They have large hairy leaves and dense clusters of heads of white, blue, pink and reddish flowers. They are extensively grown by florists as pot-plants, and by careful breeding a large number of varieties have been obtained.

CINERARY URNS, urns in which the ashes of the dead were deposited after the body was burned. Many Greek and Roman urns are in a high style of art, and are formed of bronze, marble, glass or pottery ware. See Burial.

CINGALESE. See Singhalese.

CINNA, sĭn'ą, **Lucius Cornelius,** Roman patrician, associate of Marius and leader of the popular party, during the absence of Sulla in the East. In 86 B.C. he was elected consul along with Octavius, and in violation of his oath to Sulla he attempted to overpower the Senate and to procure the recall of Marius and his party from banishment. In the contest which ensued he was defeated by his colleague and driven from the city. His office thus became vacant, and the Senate appointed another consul in his stead. He soon returned, however, along with Marius, and laid siege to Rome. The Senate was forced to capitulate; but while the votes of the people were being taken for the repeal of the sentence against Marius he broke into the city, massacred the friends of Sulla and allowed his partisans to commit frightful excesses. He was consul for the next three years; but Sulla, having brought the Mithridatic War to a close, resolved (84 B.C.) to return to Italy to inflict condign punishment on his enemies. Cinna prepared to resist him by force of arms, but was prematurely slain by a mutiny among his own troops.

CINNABAR, sĭn'ną-bär, red sulphide of mercury, HgS. The native cinnabar occurs in earthy, granular and massive forms, and also in crystals belonging to the rhombohedral system. It is red, not infrequently with a brownish or leaden cast. Its hardness is from 2 to 2.5 and its specific gravity from 8 to 8.2. Artificial cinnabar, formed by subliming a mixture of sulphur and mercury, is brighter in color than the native mineral, probably on account of its greater purity, and is known in commerce as "vermilion." Cinnabar is the principal ore of mercury, and large deposits of it occur at Almaden, Spain, at Idria in Carniola, at New Almaden, Cal., and in certain parts of China and Japan. When it is roasted the sulphur burns away and metallic mercury distils off and is condensed in earthenware vessels. For a discussion of various ancient references to cinnabar, consult *Engineering and Mining Journal,* 16 May 1903, p. 747.

CINNAMIC, sĭn'a-mĭk, **ACID,** an acid which exists in the free state in the balsams of Tolu and Peru, in liquid storax and in gum benzoin. It occurs in two forms, slender needle-like crystals, and large transparent prisms, melting at 270° F. When oil of cinnamon is exposed to the air it absorbs oxygen and deposits crystals of cinnamic acid, which are colorless and readily soluble in alcohol, ether and boiling water, but sparingly soluble in cold water. It is not of any importance in the arts and is chiefly interesting as being the acid corresponding to oil of cinnamon. This oil is the aldehyde of cinnamic acid and is represented by the formula $C_9H_8O_2$. Though isomeric with oil of cassia it has a slightly different flavor, and is much more expensive. Both of these oils are employed in medicine as aromatic stimulants, but chiefly as pleasant adjuncts to disguise the taste of nauseous drugs. From a chemical point of view, the cinnamic acid and oil of cinnamon are related to benzoic acid and oil of bitter almonds. Oxidizing agents convert it first into benzaldehyde and then into benzoic acid. It unites with hydrogen to form hydrocinnamic acid.

Cinnamic acid is one of the active principles in many of the balsams and enjoys an excellent reputation in the treatment of tuberculosis and chronic ulcerative processes. It is a marked stimulant to the skin and mucous membranes and has been very widely used in the form of an emulsion for the treatment of tuberculosis of the joints. It is prepared in quantity by keeping one part of benzaldehyde, one part of acetyl chloride and three parts of sodium acetate at a temperature of 320° F. for 24 hours.

CINNAMOMUM, a tropical genus of plants of the laurel family, natives of Asia and the Pacific islands. The genus numbers upward of 50 species, all possessing aromatic volatile oils that make them valuable articles of commerce. Cinnamon proper is the prepared bark of *C. zeylanicum*; culiwan bark comes from the *C. culiwan,* and cassia bark from *C. cassia.* The best known American relative, although not of the same genus, is sassafras. See Cassia; Cinnamon; Laurel.

CINNAMON, the bark of the under branches of a species of laurel (*Cinnamomum zeylanicum*), which is chiefly found in Ceylon, but grows also in Malabar and other parts of the East Indies. The tree attains a height of 20 or 30 feet. Its leaves are oval, the flowers are of a pale yellow color and the fruit is shaped somewhat like an acorn. There are two principal seasons of the year in which the Ceylonese bark the cinnamon-trees. The first of these commences in April, and the last in November;

the former being the cipher is the great crop is obtained. In this district are cut branches of three years' growth, are cut down, and the outside pellicle of the bark is scraped away. The twigs are then ripped up lengthwise with a knife and the bark is gradually loosened till it can be entirely taken off. It is then cut into slices and on being exposed to the sun curls up in drying. The smaller pieces, or "quills," as they are called, are inserted into the larger ones, and these are afterward tied into bundles. Cinnamon is examined and arranged according to its quality by persons who, for this purpose, are obliged to taste and chew it. This is a very troublesome and disagreeable office, few persons being able to hold out more than two or three days successively. After this examination, the bundles are made up to a length of about four feet and a weight of about 88 pounds each. From the roots of the trees numerous offsets shoot up. These, when they have attained the height of about 10 feet, are cut down and barked, being then about the thickness of a common walking-stick. The cinnamon which they yield is much finer than any other. In Ceylon the cinnamon-trees are said to be so common as to be used for fuel and other domestic purposes. The smell of cinnamon, particularly of the thinnest pieces, is delightfully fragrant, and its taste pungent and aromatic, with considerable sweetness and astringency. If infused in boiling water in a covered vessel it gives out much of its grateful flavor and forms an agreeable liquid. An oil is extracted from cinnamon, which is heavier than water. This is prepared in Ceylon, and almost wholly from the small and broken pieces. It is made, however, in such small quantities that the oil of cassia is generally substituted for it; indeed, the cassia bark is often substituted for cinnamon, to which it has some resemblance, although in its qualities it is much weaker. The leaves, the fruit and the root of the cinnamon plant all yield oil of considerable value. That from the fruit is highly fragrant, of thick consistency, and in Ceylon was formerly made into candles for the sole use of the king.

The oil of cinnamon consists mainly of cinnamic aldehyde, C_9H_8O, which, when pure, is colorless. By exposure to the air it absorbs oxygen and is converted into cinnamic acid (q.v.).

Various forms of cinnamon have been used for many years in medicine as flavoring agents and as carminatives. As cinnamon is rich in volatile oils, the action of the drug resembles the action of the oil of cinnamon, which is closely allied to other volatile oils (q.v.). The active principle in the oil is an aldehyde of cinnamic acid, and its antiseptic and antispasmodic action is due in large part to the cinnamic aldehyde.

CINNAMON FERN, a fern, *Osmunda cinnamomea*, so called from the cinnamon color of the sporangia. The plant has been known to reach the height of 11½ feet. It is frequent in boggy places from Florida and Mexico north to Minnesota and Newfoundland, and occurs also in Asia and Brazil. See OSMUNDA.

CINNAMON OIL, an essential oil distilled from the bark of the *Cinnamomum Zeylanicum*, the Ceylon cinnamon tree. The yield is from one-half to 1 per cent. It is of a bright yellow color, which gradually darkens. It consists chiefly of cinnamic aldehyde, normally from 70 to 77 per cent, with from 4 to 8 per cent of eugenol. When pure it has a specific gravity of 1.020 to 1.035. It is often adulterated, however, by an oil obtained by distilling the leaves with bark from the root. The chief constituent of this oil is eugenol, which gives its specific flavor to the oil of cloves. When exposed to the air cinnamon oil gradually absorbs oxygen and forms a resin and cinnamic acid.

CINNAMON-STONE, or **ESSONITE**, a variety of grossularite garnet, usually of a beautiful cinnamon-brown, yellowish or brownish-red color. It is a silicate of aluminum and calcium. Its name essonite is derived from the Greek *esson*, inferior, and refers to its hardness, 7, which is inferior to that of the true hyacinth, which it often resembles. It occurs in isometric crystals, usually in rhombic dodecahedrons. Cinnamon-stone from Ceylon is the finest known, and has long been cut into gems. Amber colored specimens are found at Piedmont, Italy, Phippsburg, Me., and in Quebec, Canada.

CINO DA PISTOIA, chē'nō dą pēs-tō'yą, Italian jurisconsult and poet: b. Pistoia 1270; d. there, 24 Dec. 1336. He ranks among the best of the early Italian poets, and resembles Petrarch more than any of the other predecessors of this poet. His poems were first published at Rome in 1558 by Pilli. They afterward appeared at Venice increased by a second volume, which, however, was not considered genuine. The most complete edition is that of Ciampi (1812). He published a commentary on the first nine books of the 'Codex Justinianus' in 1314.

CINQ-MARS, săn-mār, **Henri Coiffier de Ruzé**, MARQUIS DE, French courtier: b. 1620; d. Lyons, 12 Sept. 1642. At the age of 18 he was presented at court by Cardinal de Richelieu and soon obtained the favor of Louis XIII, to whom he became master of the horse. Chafing at the restraint under which Richelieu held him and ambitious of political power, he framed a conspiracy to overthrow the cardinal, of which the king himself and his brother, Gaston, Duc d'Orleans, were members. But Louis was weak and fickle, Gaston perfidious and Richelieu not the man to be put down by a youth just turned 20. Cinq-Mars was delivered up to the cardinal and beheaded at Lyons with his friend, the councillor De Thou. Consult Basserie, 'La conjuration de Cinq-Mars' (Paris 1896); Bazin, A. de R., 'Histoire de France sous Louis XIII' (Paris 1846).

CINQ-MARS. 'Cinq-Mars,' by Alfred de Vigny, is one of the most popular French historic novels. Published in 1826, it showed unmistakable traces of the influence of Sir Walter Scott and was an immediate success. The novel deals with that important and interesting period of French history which culminated in the sway of Cardinal Richelieu, the minister of Louis XIII. It is Richelieu, more than the favorite of the king, Cinq-Mars, who is the central figure of the story. The author does not keep very strictly to the historic facts and misrepresents to a great extent the characters which he portrays. For de Vigny, Richelieu is a symbol of ambition, while de Thou, the devoted follower of Cinq-Mars, is the type of the friend. Even the minor characters of the book

are treated according to the preconceived idea of the author. The novel is thus a curious mixture of history and fiction. But in spite of the falseness of the historic treatment there is much in the novel which explains and in a way justifies its wide popularity. There was a great revival of interest in the past at the time the book was written, and no other period, perhaps, was so full of dramatic incidents and gave such opportunities for character study as that of the administration of Richelieu. Again, the lyric note of the novel is admirable. The picture in the opening chapter of beautiful and peaceful Touraine, where the author himself was born and which he knew well and loved, together with passages of similar charm and beauty, such as the description of the chateau of Chambord, are veritable poetic gems—and, after all, was not Alfred de Vigny primarily a poet? The reader will gladly overlook the historical inaccuracies, which were intentional, and will forgive the rather poor psychology of the characters for the sake of the spirited and entertaining story and the passages of exquisite description.

RAYMOND WEEKS,
Professor of Romance Languages and Literatures, Columbia University.

CINQUE PACE, sĭnk pās, a kind of grave, stately dance, in which the steps were regulated by the number 5.

CINQUE PORTS, seven ports of England, on the coasts of Kent and Sussex—Dover, Sandwich, Hastings, Hythe, Romney, Winchelsea and Rye. They were originally only five, the two latter having been declared ports subsequent to the first institution; hence the name *cinque,* five. The precise designation of these seven localities is "The Cinque Ports and the Two Ancient Towns," the last named being Winchelsea and Rye. They were granted special privileges by the later Saxon and earlier Norman kings, on condition of providing a certain number of ships during war, there being no permanent English navy previous to the reign of Henry VII. The ports are, collectively, in the jurisdiction of a lord warden, whose office, though the salary is £3,000 a year, is little more than a sinecure. Consult Burrows, 'The Cinque Ports' (in 'Historic Towns Series').

CINQUECENTO, chĭng-kwē-chĕn'tō, in Italian, 500, an abbreviation for *mille cinquecento,* or 1,500. The term is used to designate the art styles of the 16th century, or such as were developed about, or after, 1500. In like manner the terms *trecento* and *quatrocento* denote art of the 14th and 15th centuries. The Cinquecento is the period of the highest perfection of the arts of the Revival or Renaissance.

CINQUEFOIL, sĭṅk'foil. (1) In botany, a species of the genus *Potentilla* of the Rose family, closely allied to the strawberry. There are about 300 species, chiefly natives of the temperate regions of the northern hemisphere, 175 of them occurring in North America, scattered throughout the continent. In northern New England the shrubbery cinquefoil (*Dasiphora fruticosa*) is a troublesome weed. The name of the genus is from Latin *potens* (powerful), from the supposed powerful medicinal virtues of some of the species.

(2) In [illegible] and [illegible] ornament in the Gothic style [illegible] native [illegible] of five foliated divisions, often seen in circular windows. In heraldry, it means a five-petalled corolla borne without a stalk and full-faced.

CINTRA, sēṅ'trạ, Portugal, a town in the province Estremadura, 15 miles northwest of Lisbon, on the slope of the Sierra de Cintra. The country around is extremely beautiful, and the climate mild and agreeable. On these accounts it is much resorted to by the wealthier inhabitants of Lisbon, who have here their *quintas* or country houses. Cintra is celebrated for the convention entered into there in 1808, by which the French, after their defeat at Vimeira, were not only permitted to leave Portugal, but were conveyed to France with their arms, artillery and property. Pop. 4,846.

CIOTAT, sy-ō-tā, **La,** France, a seaport, department of Bouches-du-Rhône on the Mediterranean, 15 miles southeast of Marseilles. It has a safe and commodious harbor and carries on a considerable trade in the productions of the district. The yards and workshops of the Messageries Maritimes Company employ about 3,000 hands. The town, surrounded by its old ramparts, consists of well-built houses and spacious, well-paved streets. The surrounding district yields wine, oil, oranges, etc. Pop. 9,975.

CIPHER, a kind of monogram, in which the initials of a person or persons are intertwined with each other.

CIPHER DISPATCHES. See CIPHER WRITING.

CIPHER WRITING, a method of sending important intelligence in a manner so effectually disguised that only those for whom the communication is intended can understand the meaning of what is written. Till comparatively recent years diplomats, statesmen and military or naval commanders were the principal persons compelled by circumstances to keep their affairs or their intended movements shrouded in secrecy. So long as there was not regular postal service important letters were sent by courier, and thus the weightiest secrets were often at the mercy of any one inclined to be dishonest. Before the spread of education, and at a time when few possessed a knowledge of any other language than their own, to indite a letter or dispatch in a foreign tongue was usually ample protection against a surreptitious prying into its contents. But this safeguard has broken down, and it became necessary for all who did not want their correspondence known to interested parties to contrive some means of communicating with the pen that would defy scrutiny.

Hence there came into extensive use the art of writing in cipher, called also cryptography, from the Greek words κρυπτός, "secret," and γράφειν, "to write." Under this term are included all private alphabets or systems of characters for the safe transmission of secrets. A popular cipher for ordinary purposes is found by using the alphabet in an inverted order, taking Z for A, Y for B, X for C and so on. When it is only desired to write a cryptogram, and not print it, such other characters may be used as are mutually agreed upon by correspondents, or the alphabet may be transposed in

other ways. A figured cipher is one in which the letters of the alphabet are numbered and these numbers compose the cryptogram. To ensure secrecy it is, of course, necessary that the particular series of numbers chosen shall be known only to those who use the cipher. Another plan consists in choosing a certain book — a dictionary appears to have been the favorite — and by a simple citation of the number of the page, of the column and of the line, sentences were constructed, the key to which was extremely difficult of discovery by one not in the secret.

As the number of different dictionaries was necessarily limited, however, the mystery could usually be solved by any one willing to devote time and patience to hunting up the particular one adopted. Various other books have been similarly used, such as spelling books, and even the Bible; but these systems are cumbersome, and were all more or less open to detection. From a few rules, as for instance, that in English *e* is the letter which most frequently occurs, and *the* the most common word, the whole might generally be deduced. The task of detecting cipher methods is rendered much more difficult when false characters, which are not to be counted, have been interspersed throughout the cipher. A curious explanation of the process of unraveling a cipher is given in Poe's story of the 'Gold-Bug.' Still, with devices such as these, more or less ingenious, the world was fain to be content until the advent of telegraphy. Immediately a new want made itself felt. If the mail was slow, it afforded privacy, but the contents of a telegraphic message are of necessity known to others besides the sender and the receiver. So the minister, the banker and the merchant soon began to send cipher despatches. It was quickly discovered, however, that existing methods of cipher writing were unadapted to telegraphy; the costliness of the new invention necessitated brevity; and thus it was not long before there went whirling over the wire messages of 10 words that, properly deciphered, included from 30 to 50. Cryptography became a recognized calling, requiring thought, labor and inventive skill. A great proportion of commercial messages — orders to buy and sell and the like — are similar in their terms, and hence it is that a single word representing three or four words in frequent use is the plan on which our present cable ciphers are based, whereby there is annually a large saving in expense. Then, too, as trade increased and competition became fierce, every firm wanted or needed its own cipher system, distinct from any other. Hence there is a vast number of ciphers in use in every great commercial centre such as New York or London. There are firms which specialize in the preparation of ciphers or "cable codes" containing from 50 to many thousands of words. The International Office of the Telegraph Administrations in Bern, Switzerland, published an "Official Vocabulary for Telegrams in Preconcerted Language" (1899–1901). In 1903, however, it was internationally decided that, after July 1904, all combinations of letters that do not exceed 10 will pass as one cipher word, "provided that it is pronounceable, or that it is taken from the following languages: English, French, German, Dutch, Spanish, Portuguese or Latin." This concession widened enormously the scope of admissible words and huge, complicated codes sprang into existence. From the volume issued by the Lieber Code, for instance, it is claimed that 100,000,000 combination ciphers can be devised. The "Simplex Cryptograph" (Providence, R. I., 1902) is a small book, giving over 50,000 numbered cipher words with a "key" to each one. In this, e.g., the number 33,458 can be expressed by the word "post," and 50,551 by the word "vary."

The cipher codes of the State Department at Washington and those of other governments are frequently changed. The special code is entrusted to the personal custody of diplomatic officials embarking on a mission, who retain possession of it and destroy it if their lives are endangered. The imprisonment of the United States Minister Conger, in Peking, in 1900, caused the cipher to figure conspicuously in international relations. China objected to the transmission of cipher dispatches, but subsequently withdrew her objection. She was accused of having obtained surreptitious possession of a copy of the United States cipher code.

For private individuals desiring to communicate in cipher by letters through the post it is easier to devise a code of 26 letters or signs representing the alphabet. To avoid unauthorized deciphering of the message, it is advisable not to separate the words into their natural groups of letters; thus instead of arranging the signs or letters representing, say, "Come and see me," place them in this fashion: com eandse eme." Instead of having a certain sign or letter invariably represent the same letter, it is safer to adopt an arbitrary sentence of 26 letters and place them under the 26 letters of the alphabet. Such a code can easily be carried in the memory. The following example of such a cipher, taken from a book published in London, will explain: "Hush Money, by Charles H. Ross, Esq." By placing these letters under the alphabet we get H=A; U=B; S=C; H=D; M=E, and so on. Hence,

Ohs ya h sych, oayarsa rr loucys syms,
Osrh srore rrhmu h smsmsmah emshyr snms,

could only be deciphered by the receiver as

Far in a wild, unknown to public view,
From youth to age a reverend hermit grew.

Another method, absolutely undecipherable by any "outsider," is to adopt a method of numbering somewhat as follows: Ignore all vowels, h, y and w, or invent separate signs for them, using these only where absolutely necessary; then replace the consonants with figures like this: L=1; N=2; M=3; R=4; F and V=5; P and B=6; T, TH and D=7; SH and CH=8; K and C (hard)=9; S, Z and C (soft)=0. From this can be made 93275837344=KMNDFCHM TM RR: "Come and fetch me to-morrow." This system is specially adapted for writing numbers by words: Ignoring vowels, h, y and w, Kansas=9200; Smith=037; London=1272; California=91542; 127="land"; 894="sugar." The same code can also be used to commit a number of figures to memory: If it is desirable to remember the number 746,527,682; this gives, in code, the letters DRPFNDPSHN. By inserting vowels between these consonants, the sentence can be made, "Drop off and push on." By mentally repeating the sentence each consonantal sound suggests a figure, hence 746,-

527,682. By using figures for letters and vice-versa, the telephone number "Central 3277" would read: "02741 Mandate." The consonants must be used phonetically, as in stenography, regarding the "c" in central as "s." The introduction of an occasional "dummy word," i.e., one not to be reckoned, will serve further to baffle attempts at elucidation. An interesting account of how the cipher dispatches in the Tilden electoral canvass of 1876 were deciphered by New York journalists is given in *The Tribune*, 21 Nov. 1878 (Extra No. 44).

CIPHERS, signs for numbers (see NOTATION). They are either borrowed signs, as letters, with which the Greeks and several tribes of the north of Europe designate their numbers; or peculiar characters, as the modern or so-called Arabic ones, though the Arabs do not use them, and never did. The ciphers, such as they are at present, 1, 2, 3, 4, 5, 6, 7 8, 9 and 0, did not attain their present character till a pretty late period. We received them through the Arabians from Hindustan. It seems probable that the Egyptians were acquainted with the present system of ciphers, at least in its principles. As early as the 9th century ciphers were used, though seldom, in France. Not until the 11th century did their use become common in Europe.

CIPPUS, sip'ŭs, a low column generally rectangular and sculptured, and often bearing an inscription, used by the Romans for various purposes. Cippi served as sepulchral monuments, as milestones and boundaries, and in some cases to receive the inscribed decrees of the Senate. They were frequently or usually adorned with rams' heads supporting festoons of flowers, figures of sphinxes and various mythological subjects. Those serving as tombstones bore the epitaph of the deceased, including his name, the date of his birth, death, etc.

CIPRIANI, chē-prę-ā'nē, **Giambattista**, Italian painter and engraver: b. Pistoia 1732; d. London 1785. He was one of the first fellows of the Royal Academy. His drawing is correct, his heads have grace and loveliness, his coloring is harmonious and the general impression of his composition good. Many fine engravings of Bartolozzi are from the designs of Cipriani.

CIRCARS, sėr-kärz', **The Five Northern**, an ancient division of the Madras presidency, on the east coast of Hindustan. The northern Circars were formerly Chicacole, Rajahmundry, Ellore, Kondapilly and Guntur, with Masulipatam as the chief town, but the districts that now correspond most nearly with them are those of Ganjam, Vizagapatam, Godavari, Kistna and Guntur. They were among the earliest of the territorial possessions of the East India Company, which acquired four of them in 1765 from Mogul Shah Allum, who bestowed them on the company as a free gift. The fifth, Guntur, came into possession of Great Britain in 1788. Consult history in 'The Imperial Gazeteer of India' (Vol. X, Oxford 1908).

CIRCASSIA, sĭr-kăsh'ĭ-ą, a region in the southeast of European Russia, lying chiefly on the north slope of the Caucasus, partly also on the south, and bounded on the west by the Black Sea. It forms part of the government of the Caucasus, including a great portion of the territory of the Kuban and the districts of Sukhum and Tichernomore, but is not itself an official division; and, indeed, the name is now much less seldom heard than formerly, since the country has been entirely incorporated with the rest of the Russian possessions in this quarter, and has no longer a separate political existence. The whole region is mountainous, and is composed of the northern masses or western offshoots of the great chain of the Caucasus, the culminating heights of which are those of Mount Elbruz. The mountains are intersected everywhere with precipitous ravines, in the deepest hollows of which flow rock-impeded streams that occasionally become raging torrents. The chief rivers are tributaries of the Kuban and the Terek, the first of which bounds the territory on the northeast and east sides, while the Terek skirts the Circassian limits on the southeast side. Circassia is a beautiful though rugged country. The sides of the mountains are often clothed with thick forests. Its climate is temperate, its inhabitants are healthy and long-lived. There are few manufactures and little trade; but the valuable oil deposits are now being worked.

When Russia took possession of this region the exodus of the inhabitants left comparatively few Circassians proper, and those who remained have now to a large extent lost their national peculiarities. The people call themselves Adighé; the Tartar word *Tchertkess* being a slanderous name applied to them as "robbers." The Circassians were divided into several tribes, having three distinct languages or more. Each tribe included five ranks of men, namely, princes or chiefs (*pshat*); nobles (*vork*); middle class (*thlofokl* or *tokavs*); serfs or retainers of the nobles, and slaves — the latter being prisoners taken in war or the descendants of such. All classes except the slaves were united into fraternities for mutual support; and this union formed the real groundwork of the government of the country, which was altogether peculiar, being patriarchal in nature, with a great amount of freedom. Hereditary feud, once prevalent, was latterly almost extirpated, and pecuniary compensation, including a mulct upon manslayers for the benefit of the deceased's fraternity, was substituted. Crimes of all degrees, and civil causes, were judged either in general or local councils; and petty offenses by district judges and assessors.

The religion of the country was chiefly Moslem; but in many cases it formed a jumble of Christian, Jewish and heathen traditions and ceremonies. In no case was it very strict; although most of the chief Mohammedan feasts and fasts were pretty well observed. The morals of the people were good. Great crimes were rare; and such as have their sources in poverty with one class and avarice in the other were not common, for property was little coveted, and money was scarcely known. The commerce of presents was universal; few or none were very rich, and there were no miserably poor at all. There was no tenure of land in Circassia except what immediate possession, for the purpose of cultivation, gives.

Agriculture is still in a rude state, but the produce of the tilled lands is considerable and exceeds local wants. The forests yield great quantities of fine wood, including oak and all our own best species of timber trees,

with (in the southern regions) boxwood, etc. The chief grain is millet; but barley, oats and a little wheat are also raised. There are great numbers of goats, sheep and oxen.

The Circassians, male and female, are a well-formed and handsome race. The males are highly prized as warriors by the Russians, and the females as mistresses by the Turks, a position generally envied by the women themselves. The men are among the finest equestrians in the world, and their horses, though small, are of good stock, hardy and intelligent.

The early history of the Circassians is obscure. They have no annals; but their minstrels, in their martial and genealogical strains, preserve traditional accounts of the deeds and lineage of their dead heroes and existing tribes. Between the 10th and 13th centuries this country formed a portion of the empire of Georgia, and it is said the Georgian queen Tamar subjugated and for a time Christianized them. During the Middle Ages the Genoese had several trading stations on the coast, of which some memorials yet exist. In 1424 the Circassians were an independent people and at war with the Tartars of the Crimea, etc., to whose khans, however, it is understood some were occasionally tributary. In 1555 the Muscovite tsar, Ivan Vasilievitch, came to their aid against the Tartars and married a Circassian princess. But the stay of the Russian forces was short, and after their withdrawal the belligerents kept up a struggle with varying results till 1705, when the Tartars were finally defeated in a decisive battle. Shortly after the territorial encroachments of Russia on the Caucasian regions began. From that time she advanced by steps slow and stealthy and in 1781 obtained a frontier line on the right bank of the Kuban, the left bank of which formed the national limit of Circassia. In 1784 the Turks founded Anapa, near the northeast corner of the Black Sea, as a place of trade for their commerce and that of the Circassians; this was the only territorial settlement they as yet had in or near the country and the place was a mere factory. In 1807 the Russians took Anapa from the Turks; but in terms of the Treaty of Bucharest, in 1812, it was restored. In 1829 it was once more taken by the Russians and finally ceded to them by the Treaty of Adrianople, along with the whole of Circassia — as they interpreted the words of that cunningly ambiguous document; the fact being that not an inch of the territory of Circassia proper had ever been in the possession of either Turks or Russians. Many of the Circassians were indeed Mussulmans and all such recognized the padisha (sultan) as their spiritual head, but nothing more. As the "hated Muscovites" (*fana Moscov*) immediately proceeded to act upon the pretended cession, a struggle commenced which was continued over a long series of years. The spirit of resistance to Russia became stronger than ever; and a bold leader, Schamyl, who united in his person the imputed sanctity of the hierarch with the daring courage and prudent conduct of a great warrior, with his heroic band beat off or baffled the whole disciplined forces that Russia was able to send against him. But at length the protracted resistance of the people, extending for a period of 35 years, terminated in the triumph of the more powerful of the foes and the Circassians with their leader surrendered. Large numbers of them, as many it is said as 500,000, were deported into the Turkish provinces in 1864 and were settled in Asia Minor and in Bulgaria and Serbia. A considerable portion of their former country was thus ruthlessly almost denuded of inhabitants.

CIRCE, sêr'sē, in classical mythology, a sorceress on the island of Ææa. Ulysses in his wanderings landed on her island, and sent out Eurylochus with a party to explore the country. They arrived at the palace of Circe, who gave them food and wine, and with her magic wand changed them into swine. Eurylochus only, by cautiously abstaining from the magical potion, escaped the transformation, and informed Ulysses of the event. He immediately proceeded into the country to free his companions. On the way Hermes (Mercury) met and advised him. Following the advice of Hermes he then ran upon her with his drawn sword, threatening her with death, and compelled her to bind herself by an oath to do him no injury and deliver his companions. Ulysses then remained with her a whole year. Before his departure she told him that in order to secure a safe return to his country he must visit the infernal regions and ask advice of Tiresias. This he did, and again visited Circe on his way back. The story is told in the Odyssey.

CIRCINUS, sêr'sĭ-nŭs ("the Pair of Compasses"), one of the 14 southern constellations added to the heavens by Lacaille in connection with his work at the Cape of Good Hope in 1751–52. It is surrounded by Apus, Musca, Centaurus, Lupus, Norma and Triangulum Australe.

CIRCLE, in geometry, a plane figure contained by one line, which is called the "circumference" and is such that all straight lines drawn from a certain point (the "centre") within the figure to the circumference are equal to one another. According to this definition of Euclid, which is remarkable for its perspicuity and precision, the circle is the space enclosed, while the circumference is the line that bounds it. The circumference is, however, frequently called the circle. Still no confusion ever arises from this usage.

The properties of the circle are investigated in books on geometry and trigonometry. Properly the curve belongs to the class of conic sections and is a curve of the second order.

The Cartesian equation of a circle with centre at the origin and radius R is $X^2+Y^2=R^2$. Its polar equation is $P=R$. The general Cartesian equation of a circle is $x^2+y^2+ax+by+c=0$; the general polar equation is $P \sin(\vartheta+\alpha)=a+bP^2$. From the standpoint of projective geometry, a circle is any conic passing through a certain pair of imaginary points at infinity, known as the circular points.

The celebrated problem of "squaring the circle" has given rise to extraordinary geometrical labors, and even now there are to be found, as in the case of the problem of perpetual motion, those who profess to have solved it.

The question is to construct by rules and compass a square whose area shall be equal to the area of a circle. It is not possible to do so. This was only shown within the last 36 years

handed direction or in a left-handed direction (whence the names), extinction is again obtained. Quartz is named right-handed quartz or left-handed quartz according to the direction in which the analyzer must be turned. The difference between right-handed and left-handed quartz is due to the fact that the right-handed circular component travels faster in the former and slower in the latter. The amount of the angle through which it must be turned depends on the thickness of the plate of quartz.

If, instead of using homogeneous light, as we have been supposing, plane-polarized white light is employed, it is found that the different rays are differently deviated. The effect of the more refrangible rays is greater than of the less refrangible, and the plane of polarization of the blue rays will thus be turned through a greater angle than that of the red rays. It will be perceived from this that having arranged the polarizer and analyzer, and inserted a plate of quartz, as described above, on rotating the analyzer in the direction, right-handed or left-handed, that corresponds to the nature of the plate of quartz, we shall not arrive at a position of total extinction, but we shall see a most beautiful play of colors changing in order from red to yellow, then to orange, green and blue. These phenomena are among the most beautiful and most striking of all the marvelous phenomena of light.

It has been remarked above that certain organic liquids and solutions have this rotatory power. Among these may be mentioned turpentine and the essential oil of anise as instances of left-handed rotatory substances, of oil of lemon and oil of caraway and solutions of sugar, as right-handed rotatory substances, and solutions of tartaric acid as showing both rotations, as explained below. This fact is taken advantage of in Soleil's saccharometer, an instrument for determining the value of cane-sugar in a liquid.

We have spoken above of the right-handed and left-handed properties of quartz; a discovery of Haüy leads us here to the very threshold of the molecular structure of crystals. We may yet hope for discoveries in this direction. On comparing crystals of quartz that give us right-handed and left-handed polarization, it is found that a very remarkable property connects their forms. The crystals that give right-handed and left-handed polarization are of an unsymmetrical construction, such that either viewed in a looking-glass gives an image of the same form as the other. Pasteur, examining the crystals of the two varieties of tartaric acid whose solutions have opposite rotational powers, but whose chemical properties are very nearly the same, showed that the same law holds for them; and, having crystallized what is known as neutral tartaric acid, was able, by picking out the crystals by hand, to separate it into equal portions of lævo-tartaric acid and dextro tartaric acid. But we must refer the reader to the special articles on the chemistry of this substance.

One of Faraday's most brilliant discoveries was the rotatory power of glass under the action of a powerful magnet. The reader is referred for an account of it to the article POLARIZATION OF LIGHT.

CIRCULATING LIBRARY. See LIBRARIES.

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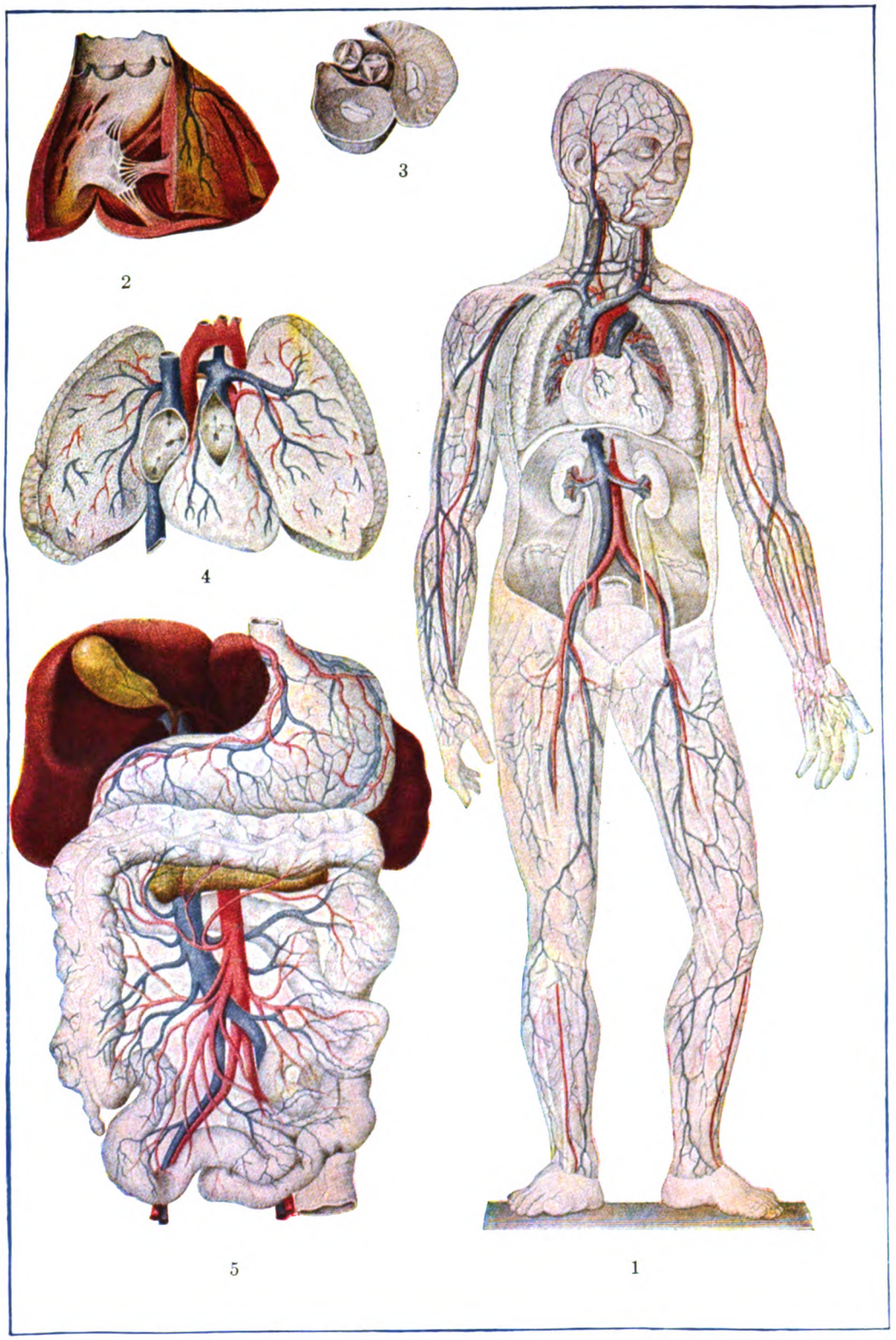
various days — the Arabs 7, 14, 21 or
after birth, though Josephus states that in
day the Arabs circumcised after the age of 13
on account of the circumcision of Ishmael, their
progenitor, taking place at that age; the Moham-
medans of Persia circumcise in the third or
fourth year; Fijians and Samoans in the

CIRCULATORY SYSTEM



[The red lines show arteries; the blue, veins.]

1. General Circulation in the Human Body.
2. The Heart, showing Interior.
3. Cross-Section of the Heart, seen from above.
4. Circulation of Blood in the Lungs.
5. Circulation of Blood in Digestive Tract.

seventh year; the Christian Abyssinians in the sixth, seventh or eighth year; while some of the African tribes that practise the rite follow the Jewish rule; others, again, performing the ceremony between 30 and 60 days after birth.

Circumcision is universally practised by Mohammedans, not on the authority of the Koran, which does not enjoin it, but as following the example of Mohammed. It seems to be doubtful whether Mohammed's omission to prescribe the rite was due to his deeming such a rule valueless where custom already decreed it, or because he attached only a physiological and not a religious importance to the ceremony. It is, however, now recognized as a religious obligation just as strongly as if it had been ordained by the founder of Islam. Circumcision among Mohammedans may be practised seven days after birth, but it is customary to postpone the ceremony to some time between the 7th and 12th year.

Christianity recognizes no religious significance in the rite, substituting for it, according to Saint Paul (Rom. ii, 25–29) "circumcision of the heart." The Church, however, celebrates as a festival the first of January, as being the day of the circumcision of its founder.

Circumcision of proselytes to the Jewish or Mohammedan faith is insisted on by the orthodox, and previous circumcision for surgical reasons is not accepted as sufficient compliance with the requirements of religion. Among some "reformed" Jews, however, the circumcision of adults has lately been abandoned. Among many savage tribes the rite is undergone at the age of puberty and is perhaps in such instances more of a sociological than a religious ceremony, being akin to other mystic rites which mark the entrance of the young into full tribal fellowship.

The circumcision of women is effected by the removal of a portion or the whole of the clitoris. It is perhaps practised more in Arabia than elsewhere, but has never prevailed among Jews. The inner significance of circumcision is psychological. It is a purely symbolic rite, the origin of which is lost for the conscious life of the individual. It has no intrinsic medical value whatever, save where some maldevelopment is present. The motive of cleanliness is solely a rationalization to endeavor to explain its deeper psychological significance as a type of racial identification and an index of the father pixation fantasy in the unconscious. The operation is sometimes attended with grave consequences, hence should be done by surgeons only.

CIRCUMFERENCE, or **PERIPHERY**, the curve which encloses a circular, elliptic or other plane area. In figures bounded by straight lines, as the triangle, square and polygon, the term perimeter is employed to designate the sum of all the bounding lines taken together. The length of the circumference depends partly on the nature of the curve; thus, that of the circle of radius r and diameter d $=2\pi r=\pi d$, where $\pi=3.141592\ldots$ and that of the ellipse

$$2\pi a\left\{1-\left(\frac{1}{2}\right)^2\frac{e^2}{1}-\left(\frac{1.3}{2.4}\right)^2\frac{e^4}{3}-\left(\frac{1.3.5}{2.4.6}\right)^2\frac{e^6}{5}-\ldots\right.,$$

where a is the semi-axis major, and e the eccentricity. See CIRCLE, etc.

CIRCUMFLEX, in grammar, one of the three accents, formed by the union of the other two, thus, ^, ~. It originally denoted a rising and falling of the tone in the pronunciation of the syllable. In Greek it is used in certain cases to indicate the long vowel of the last syllable or of the penult. In Latin the mark is Λ. It is not used in English, and in French is usually a sign of the elision of a letter, often the letter *s*, and therefore indicates a prolonged sound.

CIRCUMNUTATION, the continuous motion of every growing part of a plant, in which it describes irregular elliptical or oval figures. The apex of the stem, for instance, after pointing in one direction, moves round till it points in the opposite direction and so on continuously. The term circumnutation was first used by Darwin.

CIRCUMPOLAR STARS, stars near the Pole that appear to move around it, and perform their circles without setting. A star whose polar distance is less than the latitude of a place in the same hemisphere will never set at that place. If the place is in the other hemisphere it will never rise. They are constantly used by astronomers in connection with meridian work for determining latitude of a place or the azimuth of a line. The pole-star Polaris or Alpha Ursæ Minoris, usually known as the North Star, is the most used for that purpose.

CIRCUMSTANTIAL EVIDENCE, evidence which tends to prove a particular fact by the proof of other facts, from which it is concluded that the particular fact must have happened. It is the natural and reasonable inference resulting from facts which have been established.

If A is on trial for the murder of B, and a witness testifies that he saw A shoot B, and a few minutes later B died, that would be direct evidence; whereas if the witness testified that B had been shot and the bullet found in the body of B was of a particular make only used by A and that A was in the neighborhood at the time of the shooting, the jury might infer that A was guilty; but if A could prove that his pistol had been stolen from him shortly before the shooting and he had not recovered it at the time of the shooting, it would be a complete defense and the verdict would depend on the credibility of the witnesses.

Circumstantial evidence is of two kinds: that from which a certain conclusion necessarily follows and that from which a certain conclusion is only probable or likely. If the body of a man is found with a bloody right hand impression on a part of his body where it is impossible for him to put his right hand, the presumption is that some one was present at or since the time the person was hurt; but if that is all of the evidence, it is impossible to tell whether the bloody impression was made by the person at the time of the assault, or by some one after the assault had been committed. In civil cases the jury may decide according to the weight of the evidence; but to convict a person of a crime the evidence must be such as to leave no reasonable doubt as to his guilt. See CRIMINAL LAW.

CIRCUMVALLATION, a fortification consisting of a parapet of earth and a trench, constructed by a besieging army around its camp, to guard against attempts to relieve the place besieged.

CIRCUS, a word which has come down to us from the Latin without change, meaning "circle" and used by the Romans to indicate the place in each city where chariot races, gladiatorial contests and feats of skill were held. The circus building in Roman times was without a roof, rectangular in shape, except that one short side formed a half-circle; on both sides and on the semi-circular ends were the seats of the spectators, rising gradually one above another, like steps. The largest of these buildings in Rome was the Circus Maximus, 1,875 feet long and 625 feet wide and capable, according to Pliny, of containing 260,000 spectators. At present but few vestiges remain, but the circus of Maxentius is in a better state of preservation. Grown great through conquest of other peoples, the Romans of 2,500 years ago (and for 10 centuries later) encouraged all forms of pleasure which would develop to its highest pitch the fighing instinct in their soldiery. Among the circus games were chariot races, a favorite sport of the Romans; athletic contests; the Trojan games, contests on horseback; and combats with wild beasts in which beasts fought beasts, or beasts with men (either criminals or volunteer). The prizes given to the victors were often valuable and the honors great. In the decadence of Rome came a decline of the circus and it was frequently debased by revolting spectacles, in which Christians or others temporarily hated by the government were given over to wild beasts or crucified. Julius Cæsar dug ditches around the circus and filled them with water. This served the double purpose of protecting the spectators from the sudden swerving of a chariot or spring of a tiger and of making possible the novelty of feats of skill on the water. Most of the vessels then were propelled entirely by banks of oars and Cæsar held rowing-races, swimming-races, etc. Most of our grotesque picnic-games, like swimming in a barrel or running in a sack, are relics of his fertile inventions to please his restless, turbulent people. There was no charge to see these entertainments, as a rule, the circus being used as a pacifier by the emperor.

America has taken the lead in the reproduction of the Circus Maximus. This is probably because the American people are of a similar strenuous, contest-loving, restless disposition. It was his acute perception of this disposition in his countrymen that led Phineas Taylor Barnum (q.v.), a Connecticut Yankee, to devote his life to entertaining his countrymen by giving them a real circus. The magnitude of the Barnum & Bailey circus and menagerie can scarcely be described. It is usually formed by making three immense rings, three different performances being given simultaneously. The capital invested in this and other circuses in America is enormous, being estimated at over $100,000,000.

Since about 1890 there has developed a peculiar American form of circus which is worthy of mention. This is a reproduction in the ring of the habits and customs of the "cowboy" and pioneer of our own western plains. The exhibition is termed a "Wild West" show. It was originated, practically, by William F. Cody (q.v.), known on the plains as "Buffalo Bill." He was a former government scout, and thus became familiar with many Indian tribes. With the aid of the late Nathan Salsbury he organized an exhibition of frontier and Indian life which rivals Barnum & Bailey's in point of interest and profit. He had a hundred western cattle-herders, who gave marvelous illustrations of the perfect horsemanship of the plains; he also had many American Indians from a score of tribes, who gave their war-dances and weird chants; also Mexican lariat-throwers, performing wonderful feats with a swirling rope, and "rough riders" from many lands. Altogether, this made a "show" which appealed powerfully to both the young and the old American. Several less important "Wild Wests" have also been organized.

Some American college youths have in recent years endeavored to revive interest in the ancient Grecian Olympic games. Delegations went to Athens in 1896 and 1906 to compete with the modern Greeks and other national champions. Similar athletic contests were held in Paris 1900; London 1908, and Stockholm in 1912.

CIRENCESTER, sĭz'ĕ-tẽr, England, town in the county of Gloucester, on the river Churn, 17 miles, southeast of the city of Gloucester. The chief industries are malting, brewing and cutlery manufacture; it also has a large wool trade. The town contains the remains of the gateway of an abbey founded in 1117 and several churches of interest. In the environs is the well-known Royal Agricultural College, with a large number of students coming from all parts of the world. It is an important live stock and wool market. Cirencester was founded by the ancient Britons, and later, under the name of Corinium, became a Roman station. Various Roman remains, including those of an amphitheatre, have been discovered in it, and numerous relics belonging to this period of its history have from time to time been discovered. Cirencester was twice stormed by Prince Rupert in the great civil war. Pop. 7,631.

CIRILLO, chē-rēl'lo, **Domenico,** Italian republican and naturalist: b. Grugno, Naples, 1734; d. Naples, 29 Oct. 1799. He officiated in early life as professor of botany, afterward accompanied Lady Walpole to France and England, became a fellow of the Royal Society of London, a friend of Buffon, D'Alembert and Diderot, and on his return to Naples was appointed physician of the court. After the proclamation of the republic by the French, he was chosen representative of the Neapolitan people, and member of the legislative commission (1799); and on the re-establishment of royalty suffered death on the scaffold, rather than take the oath of allegiance or ask a pardon from King Ferdinand. His principal writings are 'Fundamenta Botanica' (1787); and 'Entomologiæ Neapolitanæ Specimen' (1787). Consult Giglioli, 'Naples in 1799' (London 1903).

CIRL-BUNTING, sêrl'bun'tĭng, a small and very handsome European bunting (*Emberiza cirlus*), rare and local in England, often kept as a cage-bird, though its song is slight.

CIRPAN, cher'pán, a town of eastern Rumelia, Bulgaria, on the tributary of the Maritza,

30 miles east or Philippopolis. It is situated in a fertile, fruit-producing region and is noted for its mineral springs. Pop. about 12,000.

CIRQUE, sêrk, a broad amphitheatre-like valley head, also sometimes called a glacial bowl. It is usually the gathering ground for the snow and névé that form the glacier. Cirques usually have steep rock walls and are often occupied by small lakes. They constitute a striking feature of mountain landscapes in glaciated regions. As the bergschrund crevasse is formed at the head of the glacier, where the ice pulls away from the rocky walls, these walls are exposed to frost work, which loosens large blocks of rock. Each winter, with the accumulation of new snows, these loosened blocks freeze into the glacier and are dragged away down the valley. Thus the valley head grows larger and larger, until a typical cirque is formed. See BERGSCHRUND.

CIRRHOSIS, kĭ-rō'sĭs, a process of chronic, inflammatory reaction in an organ, due to some form of constant irritation. It is characterized by the excessive production of connective tissue in the part, which increase of connective tissue gradually invades the blood-vessels of the organ and slowly encroaches upon its essential glandular tissues. This connective tissue proliferation is probably a result of a lack of balance of autonomic and sympathetic nerve stimuli. Cirrhosis may occur in almost any portion of the body, but it is characteristically present in only those organs which are rich in functionating parenchyma, such as the kidney, liver, spleen, pancreas and brain. In each of these organs it produces very definite forms of change with clearly defined clinical course and history, according to the functioning organ. Thus, in the kidneys, cirrhosis constitutes one of the forms of Bright's disease or chronic nephritis (q.v.). Cirrhosis of the liver results in a well-defined form of liver-disease, or chronic cirrhotic hepatitis (q.v.). Cirrhosis of the spleen and cirrhosis of the pancreas also occur, and there is a well-known form of cirrhosis of the brain associated with degeneration. (See SENILE DEMENTIA). These different forms of cirrhosis will be discussed under their separate headings.

CIRRIPEDIA, an order of entomostracous *Crustacea* (barnacles), sometimes ranked as a sub-class, always fixed in the adult stage, but with free-swimming larvæ having three pairs of appendages (*nauplius*) like other *Crustacea*. The typical barnacles have the body enclosed in a reduplication of the skin which secretes a calcareous shell, on which account they were classed with the *Mollusca* until the discovery of their free-swimming larvæ led to a closer investigation of their structure. Owing to adaptation to a sedentary life segmentation of the body has become obscure, and the six pairs of jointed biramous appendages are mere fringed scoops for creating currents in the water. The eyes and other sense organs have likewise degenerated, and most species are hermaphroditic. The barnacles are exclusively marine, and a great many are parasitic.

Four sub-orders are distinguished: (1) *Thoracica,* including the typical, free-living, shelled barnacles of which the sessile forms (*Balanidæ, Coronulidæ,* etc.) are well known as rock and ship barnacles in which the animal is protected by a conical shell formed of several pieces, with a multivalve conical movable lid, having an opening through which several pairs of long, many-jointed, hairy appendages are thrust, thus creating a current which sets in toward the mouth. The young have oval bodies, with a single eye, a pair of antennæ, with three pairs of legs. After swimming about for some time it attaches itself by its antennæ to some object, and now a strange backward metamorphosis begins. The body becomes enclosed by two valves, the stalk by which it is anchored grows larger, the feet become more numerous and eventually the barnacle shape is attained. The goose-barnacle (*Lepas*) is not sessile, but is flat and triangular, and attached to floating bits of wood or seaweed by a long, large, soft stalk. (2) *Abdominalia,* parasitic barnacles, in which the sexes are separate and very unequal in size. In this group is presented the remarkable phenomenon of dwarfed complemental males discovered by Darwin. The females live in burrows in the shells of mollusks and other barnacles, while the males are minute, lack mouth, digestive canal and appendages, and live, often several together, permanently attached to the female. (3) The *Apoda,* whose body is maggot-shaped, are hermaphrodite and parasitic in other barnacles. (4) *Rhizocephala:* This group presents perhaps the most extreme cases of degeneration, through parasitism, known among animals. *Sacculina,* which attaches itself to the abdomen of the crab, is little more than a bag of genital organs which draws its nourishment from the tissues of its host by means of branching root-like processes which penetrate to every part of its body. Consult Darwin, 'Monograph of Cirripedia.'

CIRRUS. See CLOUD.

CIRRUS, in botany, the tendril by means of which certain plants climb, usually a modified leaf or the prolongation of a midrib.

CIRSIUM, a genus of plants belonging to the family *Asteraceæ,* generally known as thistles, common in most temperate regions. Many of them are troublesome weeds, though said to possess medical properties which make them useful in fevers. Among the more common of them are *C. arvense* (corn-thistle, way-thistle or creeping-thistle), which has strong fleshy roots extending underground, and is difficult of extirpation; and *C. lanceolatum* (spear-thistle), which, both from its size and rough feeding, is a great robber of the soil, but being only a biennial is more easily managed.

CIRTA, sir'tà, a city of northern Africa, the capital of the Numidian prince Syphax, and an important fortress of Masinissa and his successors. Later it became a flourishing Roman colony. It was much injured by the troops of Masentius in 310 A.D., but was restored by Constantine and named Constantina. The modern Constantine occupies its site.

CISALPINE REPUBLIC, Italy, a former state in the northern part. After the battle of Lodi, May 1796, General Bonaparte proceeded to organize two states—one on the south of the Po, the Cispadane Republic, and one on the north, the Transpadane. These two were on 9 July 1797 united into one under the title of the Cisalpine Republic, which embraced Lombardy, Mantua, Bergamo, Brescia, Cremona, Verona and Rovigo, the duchy of Modena, the

principalities of Massa and Carrara, and the three legations of Bologna, Ferrara and the Romagna. The republic had an area of more than 16,000 square miles, and a population of 3,500,000. The seat of the government or Directory was Milan. The army consisted of 20,000 French troops, paid by the republic. The republic was dissolved for a time in 1799 by the victories of the Russians and Austrians, but was restored by Bonaparte after the victory of Marengo, and some modifications of constitution were made and the area was increased. In 1802 it took the name of the Italian Republic, and chose Bonaparte for its president. In 1805 the republic sent a deputation to Napoleon with authority to give him the title of king of Italy. The territory was known as the kingdom of Italy until 1814. In 1815 it became a part of Austria. It is now a part of the Italian kingdom.

CISCO, sĭs'kō, a local name, probably from the Indian language, applied to several species of fresh-water fishes of the family *Salmonidæ* (q.v.) and closely allied to the whitefishes (q.v.), with which they are sometimes placed in the genus *Coregonus,* or separated under the name *Argyrosomus.* They are distinguished from the true whitefishes by having the lower margin of the premaxillary bone horizontal instead of vertical, and by the larger mouth. Nine or 10 species have been described from North America, most of them belonging to the waters of particular lakes or lake systems. The most important is *A. artedi,* which is found in the Great Lakes and adjoining regions, being represented in the small lakes of Indiana and Wisconsin by a slightly modified race. Under the name of lake herring it is the object of an extensive fishery on the lakes, second in value only to that of the true whitefish. It is a voracious fish, swimming in large schools, frequenting deep waters during most of the year, but spawning in the shallows during the winter. The other species inhabit various lakes and the river systems of Alaska, etc. Similar species also occur in Europe and Asia.

CISLEITHANIA, sĭs-lī-thā'nĭ-a, a river on the boundary line between Austria and Hungary.

CISNEROS-BETANCOURT, thēs-nā'rōs bĕ-tŏn-koor', **Salvador,** Cuban patriot: b. Puerto Principe 1832. He was a descendant of one of the best families of Spanish nobility and possessed the hereditary title of Marquis of Santa Lucia. During the revolution of 1868–78 he was president of the Cuban House of Representatives and during a part of the time President of the Cuban Republic. In 1895 he was re-elected President of the new Cuban Republic. His niece, Evangelina Cosio Cisneros, was imprisoned by the Spaniards for aiding the insurgents during the insurrection in 1896–97, and made a sensational escape, coming to the United States, where she became a protégé of Mrs. Gen. John A. Logan. His daughter tendered her services to the United States as an army nurse during the war with Spain in 1898.

CISPADANE, sĭs-pā'dan, **REPUBLIC,** Italy, a republican state established by Napoleon in 1796 after the battle of Lodi. It comprised Bologna, Modena, Ferrara and Reggio. In 1797 it was united with the Cisalpine Republic (q.v.).

CISPLATINE, sĭs plā'tīn, **REPUBLIC** (Lat. *cis,* on this side, and Sp. *Plata,* name of the river on the boundary between Uruguay and Argentina). The republic of Uruguay was called by this name from 1828 to 1831. Previous to becoming an independent state it had belonged to Brazil and was called Cisplatine province.

CISRHENISH REPUBLIC, or **CISRHENAM REPUBLIC,** several towns on the Rhine, particularly Cologne, Aix-la-Chapelle and Bonn, at the time when so many republics were created, declared themselves independent, under French protection and took the title of *Cisrhenish Republic* in September 1797. But at the peace of Campo-Formio (17 Oct. 1797), the left bank of the Rhine, including the Cisrhenish Republic, was ceded to France by a secret article and the confederation bearing this name is in consequence hardly known.

CISSAMPELOS, a tropical genus of climbing shrubs of the natural order *Menispermaceæ,* whose growth is similar to that of an ivy vine. The plant is of great commercial value because of its medicinal qualities, especially the velvet-leaf of Brazil (*Cissampelos pareira*), the root of which supplies the spurious pareira brava, abuta root, used in medicine as a tonic. Other species growing in nearly all tropical countries are used for emetics and cathartics and an East Indian species (*C. obtecta*) yields an intoxicating spirit.

CISSEY, sē'sā, **Ernest Louis Octave Courtet,** French general: b. Paris 1811; d. there 1882. He was educated at the military school of Saint Cyr and having served with distinction in Algeria and the Crimea, he was promoted general of a division in 1863. He fought in the Franco-Prussian War and against the Commune of 1871. He was elected to the National Assembly in February 1871 and was Minister of War from 1871 to 1873 and in 1874–76. He was elected life senator in 1875.

CISSOID, a curve in geometry, the locus of the vertex of a parabola rolling upon an equal parabola. If pairs of equal ordinates be drawn to the diameter of a circle, and through one extremity of this diameter and the point in the circumference through which one of the ordinates is let fall a line be drawn, the locus of the intersection of this line and the equal ordinate is known as the cissoid. This curve was discovered by Diocles while he was seeking the solution of the celebrated problem of the duplication of the cube.

CIST, Henry Martyn, American soldier: b. Cincinnati, Ohio, 20 Feb. 1839; d. Rome, Italy, 17 Dec. 1902. He graduated at Belmont College 1858 and began the study of law, but enlisted as a private in the Sixth Ohio Regiment in 1861, attaining, before his resignation in 1864, the brevet rank of brigadier-general. He was post-adjutant of Camp Chase during the imprisonment of the Confederates captured at Fort Donelson, assistant adjutant-general of the Army of the Cumberland and later on the staff of Generals Rosecrans and Thomas. After the war he practised law in Cincinnati, was twice mayor of College Hill, originated the project that resulted in the conversion of the Chickamauga battlefield into a national park and was a contributor of military articles to the maga-

zines. He wrote 'The Army of the Cumberland' (1882); and collaborated with Donn Piatt in a 'Life of General George H. Thomas.'

CIST, a place of interment of an early or prehistoric period, consisting of a rectangular stone chest or enclosure formed of rows of stones set upright and covered by similar flat stones. Such cists are found in barrows or mounds, enclosing bones. In rocky districts cists were sometimes hewn in the rock itself. See BURIAL; BURYING PLACES.

CISTACEÆ, sis-tā'sę-ē. See CISTUS.

CISTERCIANS, sis-tėr'shē-ans, a monastery founded in 1698 by Saint Robert of Molesme, a Benedictine monk of Cluny (q.v.) at Cistercium, near Dijon in France. After a year Robert of Molesme was succeeded as abbot by the monk Alberic and he in turn by Saint Stephen Harding, an Englishman who ruled the order during 25 years with great wisdom and who is regarded as its second founder and lawgiver: his day in the Church calendar is 17 April. The Cistercian order in his time grew to be the most considerable monastic order in the Church and to him in great part is due the founding of the four greatest Cistercian monasteries of France, next after Citeaux, namely, La Ferté, Pontigny, Clairvaux and Morimond. By the middle of the 12th century Citeaux had affiliated with it 500 abbeys and priories, and early in the 13th their number was 1,500, of which very many were convents or priories of Cistercian nuns. For 200 years the austere rule of Saint Benedict as reinforced by Saint Stephen Harding was maintained throughout the order: there was the chanting of matins and lauds at midnight throughout the year in the abbey or priory church; there was a strict fast on one slender meal from 14 September to Easter; there was abstinence at all times (cases of sickness excepted) from all animal food, save that very rarely milk was allowed. The austerity of the Cistercian rule extended even to the churches of the order: simplicity was sought in everything; there was no display of ornamentation, either of the edifice or of the vestments, or of the sacred vessels; the copes and chasubles employed in the church services were of white linen instead of silk or cloth of gold; the chalices and the pyxes, instead of being of gold incrusted with precious stones, were of plain silver. But the Church schisms and the wars and civil commotions of the 14th century led to the plundering of the abbeys and priories, and the monastic discipline was greatly relaxed, so that on the one hand it became necessary for the see of Rome to sanction in some respects this relaxation, while on the other hand there arose zealous upholders of the ancient rules who brought back the primitive observance in all its rigor. Among the most notable of these revivers of the ancient rule was the abbot De Rancé of the monastery of La Trappe (q.v.) in the 17th century. At the dissolution of the English monasteries by Henry VIII there were in England and Wales 115 Cistercian houses, of which 25 were for nuns. In the period of the French Revolution most of the Cistercian Cenobia, not only in France, but throughout the continent of Europe, were suppressed. In the United States there are three Cistercian abbeys, La Trappe at Gethsemane, Ky.; New Mellarey, near Dubuque, Iowa, and Our Lady of the Valley, Cumberland, R. I. The most noted English Cistercians' houses were the abbeys of Furness, Fountains, Rievaulx, Tintern, Kirkstall and Woburn. A modern English Cistercian abbey is situated at Mount Saint Bernard, not far from Leicester. Consult Janauschek, 'Origines Cistercienses' (1877); Guignard, 'Monuments primitifs de la règle Cistercienne' (1877); Sharpe, 'Architecture of the Cistercians' (1874); Lefroy, 'Ruined Abbeys of Yorkshire' (1889); Eulart, 'Origines de l'architecture Gothique en Italie' (1893).

CISTERN, a tank for holding water. Cisterns differ from wells in that they do not get their water from natural sources, such as springs, but through channels made by the hand of man. In hot countries, where the supply of water is not regular, or where rain water is used, cisterns are necessary for storing up water for future use. They are also largely used for the supply of locomotive boilers at railroad stations. Cistern water used for drinking is usually filtered.

CISTUS, the typical genus of the rock rose family (*Cistaceæ*), a family having four genera, and about 160 species, of which two at most are found outside the northern hemisphere. The American representatives of the family belong to the genera *Helianthemum*, *Hudsonia* and *Lechea*, most of the species being pestiferous plants, such as the frost-weed or Canadian rock rose (*H. canadense*), poverty-grass (*Hudsonia ericoides*) and the pin-weeds (*Lechea*). Cistus does not grow wild in America, but some species are cultivated in greenhouses and the warmer regions for the beauty of their large, wild, roselike flowers, which are often of two colors. This genus, which is a native of Europe, is generally a beautiful evergreen flowering shrub, ornamental in gardens or shrubberies. Gum ladanum is obtained from *C. creticus* and *C. ladaniferus*. This gum was formerly used as an external stimulant in plasters, but is now almost obsolete in medical practice.

CITADEL (from the Italian *cittadella*, a diminutive of *città*, city; signifying little city), in fortification, a kind of fort, consisting of four, five or six sides, with bastions, commonly joined to towns, and sometimes erected on commanding eminences within them. It is distinguished from a castle by having bastions.

CITATION, a summons or official notice given to a person to appear in a court as a party to a cause. A writ issued out of a court of competent jurisdiction, commanding a person therein named to appear on a day named and do something therein mentioned, or show cause why he should not. In cases in which a citation issues it is generally the writ commencing the action, the same as a summons in trespass, or a bill in equity. The citation is used by courts having control over the estates of the dead. In law, the naming of an authority, as a legal textbook, or a State or Federal report.

CITHÆRON, sī-thē'rŏn, or **ELATEA**, a range of mountains in Greece, which stretches northwest, separating Bœotia from Megaris and Attica. The loftiest summit rises 4,620 feet above the sea, and is the subject of numerous fables and classical allusions. On its northern slope stood the city of Platæa, the circuit of whose walls may still be traced. Its modern name, Elatea, from *elatē*, a fir, is derived from

the pine forests which are abundant on its sides and summit.

CITHARA, sĭth'ą-rą, a guitar-like musical instrument, said to have been invented by Apollo. The strings, usually five or six in number, were struck with a plectrum, or picked with the fingers. It was the forerunner of the banjo, guitar, zither and similar instruments. See LYRE.

CITIES, American, Government of. Earlier Development.—In its earlier stages the American municipal system was based upon that of England, the charters of the colonial boroughs, among them New York, Albany, Philadelphia, Richmond and Trenton, following closely the English model. After the Revolution great changes were made, involving the introduction of the double-chambered council and the increase of the mayor's powers. In due course the choice of the mayor was taken from the council and given to the voters, thus making this office a separate and independent branch of the municipal government. This step was followed by vesting in the mayor's hands important powers of appointment, by the establishment of administrative boards to assist the mayor in the exercise of his functions and by greatly increased interference with city affairs on the part of the State legislature.

Relation of City and State.—The basis of American government is the municipal charter, over which the State legislature, in the absence of constitutional provisions to the contrary, has complete control. This has been completely established by judicial decisions. In many States, however, the constitution prescribes the conditions under which city charters shall be granted or amended by the legislature. In 12 States these established a system of municipal home rule under which each city acquired the right to draft its own charter and to adopt it by a majority vote of its own citizens. (See HOME RULE, MUNICIPAL). In some other States the legislature is forbidden to charter any city by special laws, being required to deal with all cities, or with all cities within designated classes, by means of a general enactment or municipal code. In a few States, notably in New York and Massachusetts, the legislature has enacted "optional charter" laws, allowing each city, with certain exceptions, to decide for itself by popular vote which of several types of charter it will adopt.

In any case the charter outlines the political organization of the city, defines the way in which the various officials shall be chosen, their relations to each other and the powers which they may exercise. American city charters are sometimes elaborate documents, setting forth in great detail the functions and responsibilities of many officials.

Administrative Officials.— (a) *The Mayor.* — In most cities of the United States the chief administrative official is the mayor, who is elected by popular vote for a term of from one to four years. Very few cities retain the one-year term. As a rule any qualified voter is eligible, but in some cities there are additional qualifications as to age and length of residence in the city. The nomination of candidates is usually by party convention or by a primary election; the election is by secret ballot, and the suffrage is that prescribed by State law for State elections. Mayors are paid salaries which vary according to the size of the city, and in the large municipalities their work demands almost the whole of the incumbent's time. As a rule a mayor who has served a term is eligible for re-election, but to this there are a few exceptions. The powers of the mayor may be grouped broadly under four heads, (1) the power to initiate municipal legislation; (2) the veto power; (3) the appointing power; and (4) powers in relation to local finance.

The power to initiate legislation arises from the mayor's right to send messages or communications to the city council upon any official matter. Except in a few cities the mayor is not the presiding officer and indeed does not usually appear before the council in person. But he may at any time address the councillors as a body by sending a written communication to be read by the clerk. These communications, after being read to the council, are referred to one of its committees and the matter to which the communication relates is in due course brought back to the council with the committee's recommendation thereon. In this way the mayor may and often does exert an important influence upon the council's legislative work.

In the second place the mayor possesses in most cities (except those which have adopted the commission plan or some similar form of government) the right to veto any ordinance or resolution of the council which does not meet with his approval. All such ordinances and resolutions must be sent to the mayor for his signature. If he approve an ordinance or resolution, he signs it; if not, he may return it to the council without his signature, accompanied by his reasons, within a designated period of time, usually five days. If within this period he neither signs nor returns the ordinance or resolution it becomes effective without any further action on his part.

But the mayor's veto of the council's action is not necessarily final. After hearing the mayor's reasons the council takes a vote of its members upon the question of sustaining or overriding the mayor's decision. If the prescribed majority of the councillors vote to override the mayor, the measure goes into effect notwithstanding the mayor's veto. This prescribed requirement is usually two-thirds of the members of the council; but in a few cities it is fixed at three-fourths or three-fifths.

Mayors have used their veto powers freely, much more so than the chief executives of the nation and the States. The passing of measures over the mayoral veto is also quite common. Much difference of opinion exists as to whether the executive veto, in municipal government, has justified its existence.

Then there is the mayor's appointing power, which is perhaps the most important among his various prerogatives. With the exception of the few administrative officials who are elected by the people, or chosen by the council, the chief positions in the city's service are filled by the appointees of the mayor. In cities under the commission form of government this power is exercised by the commission as a body, but in most of those which retain the mayor-and-council system the executive appointing power is of great importance. Not that the mayor has an unfettered hand in making appoint-

ments; in many cases his selections do not become effective until confirmed by the city council, or by the upper branch of it where there are two branches. In those cities which have established civil service rules for appointments the mayor's selections, except for headships of the administrative departments, must be made from the lists of eligibles submitted by the civil service authorities. But in any case (save in cities under the commission or the city-manager plan of local government) the mayor's appointing powers are of great importance and place large amounts of patronage in his hands.

Thirdly, the mayor has important powers of initiative in financial matters. In some cities he is responsible for the preparation of the municipal budget. In many he awards all the important contracts for public work. He also takes the first step in any exercise of the city's borrowing power. These, moreover, do not exhaust the list. He has many functions of a miscellaneous character. In fine, the office of mayor in the larger American cities carries a greater amount of power and responsibility than any municipal office in other countries.

(*b*) *Officials and Boards.*— But not all the executive functions are committed to the mayor. Many administrative powers are exercised by various officials and boards, some of whom are directly elected by the people, others appointed by the mayor or by the city council, and still others in a few cases selected by the State authorities. Chief among such officials are the city clerk, the city treasurer or city chamberlain, the comptroller or the auditor, and the commissioners in charge of various departments, for example, police, streets, fire-protection, water-supply, sanitation, parks, and so forth. Some departments, however, are controlled not by single commissioners but by boards of three, five or a larger quota of members. Such bodies are the board of education, the board of health, the overseers of the poor, the board of assessments and the like. In no two cities is there the same number of departments nor are the methods of departmental organization alike. What is done by a commissioner in one city is given to a board in another. One city, for example, may have a commissioner of police, while in a neighboring municipality police affairs are in the hands of a police board. This lack of any approach to uniformity in the number, methods of selection, terms, salaries and duties of the administrative officials is one of the outstanding characteristics of city government in the United States.

For many years, however, the drift has been in the direction of a more centralized administration. The mayor has been nearly everywhere given greater powers in the way of appointing and of controlling the heads of departments. The board system, formerly so much in vogue, has been giving way, especially in the larger communities. The tendency has been to put all the city departments, except those having charge of the schools, public health and charities, under single heads. In some cities even the last two of the three departments named have been included. The board system, it is believed, does not make for that prompt and effective action which is so often needed in administrative work. Moreover, the disposition is to place those single heads of departments directly under the mayor's control, making him solely responsible for their selection and giving him power to remove them at will. Executive centralization has gone forward steadily although in many cities it is yet far from being complete.

Administrative Functions.— The powers and functions of municipal administrators are designated from three sources. Some are assigned by the general State laws. This is particularly true of such departments as education, public health and finance. So far as these fields of administration are concerned the municipal officials are to a varying extent merely the local agents of the State in carrying out its general policy. Some powers and functions, in the second place, are set forth in the provisions of the city charter. Almost invariably the charter prescribes the authority and duties of the mayor, his relations with the city council and to the various administrative officials and boards. As for the latter, the charter may, and in most cases does, define their general duties or it may leave these things to be determined by ordinance. That is the third method of assigning functions. The city council by a series of ordinances may outline the way in which the various administrative departments shall be organized, the work which each shall perform and the powers which each shall exercise. With the growth of administrative problems in extent and difficulty, this has become the preferable method. The ordinances have greater flexibility than the charter; they can be more quickly and more easily amended. Reorganizations of departments, changes in the powers and functions of officials, many details of duty have to be changed from time to time as new administrative problems arise or as old problems assume a different form. All this can be most satisfactorily handled by the ordinance-making power, that is, by the city council with the assent of the mayor.

As for the actual duties of the chief administrative officials and boards, these are broadly connoted by the titles which they bear. The city clerk has charge of the municipal records; in a word, he is the secretary of the municipal corporation. The city treasurer has the custody of the public funds, receives the income and pays the warrants which are presented to him for payment in proper form. The comptroller authorizes the payment of bills against the city after he has satisfied himself that appropriations are available to cover them, and that the expenditures which they represent have been legally incurred. The auditor checks up all items of revenue and disbursement. The corporation counsel, or city attorney, or city solicitor, as he is variously named in different cities, is the chief law officer of the municipality. He gives advice and opinions on legal matters when so requested by the mayor or by the city council, and represents the city in all cases to which the municipal corporation is a party before the courts. The police commissioner, fire commissioner, superintendent of streets and water commissioner have duties which, in a general way, their titles imply. And the same is true of the various other administrative posts, for example, the inspector of weights and measures, the commissioner of gas and electricity, the superintendent of parks and cemeteries, the

assessors, overseers of the poor, and so on. From city to city the exact powers of these and many other officials differ somewhat in extent but in a general way they follow much the same lines.

The Subordinate Service.— Below the officials at the head of departments come the rank and file of the municipal employees, ranging from the deputy-heads, through the chiefs of divisions and bureaus, the inspectors and foremen down to the ordinary laborers. Ordinarily the heads of departments, either of their own authority or with the approval of the mayor, appoint all of these. But in some cities, though not in the majority, these selections are governed by the civil service regulations and by the same rules the employees are protected against capricious removal. The gradations and pay of the different ranks are fixed by ordinance (usually by the budget or appropriation ordinance) or in some cases by the provisions of the State laws.

State Legislation.— In most parts of the Union the intervention of the State in city affairs is frequent and of far-reaching importance. A dozen or more States have by constitutional provisions forbidden this interference in matters of local concern and have guaranteed to the cities the right to determine all such matters freely for themselves. Even here, however, the line between matters of general interest affecting the whole State and those of purely local concern are hard to draw. As a result there is still, even in these home rule States, a considerable amount of interference with affairs which primarily concern individual cities alone. In the States which have not as yet recognized the principle of municipal home rule, the hand of the central authority is extremely active in local matters. Scarcely a legislative session passes but many new statutes regulating even the minutiæ of municipal administration are enacted. And these statutory provisions often relate to such purely local matters as the pay of city laborers, their hours of work, their holidays, the paving of specific streets, the rates to be charged for water, and the way in which city officials shall keep their records. By this practice the legislatures have in many cases virtually taken away from the citizens their power to control and regulate their own purely local affairs. This authority has been in large degree usurped by the State and is exercised through channels of legislation. Herein the situation differs widely from that which exists in the various European countries. In them there is state supervision of municipal government and in some respects it is a stricter supervision than that exerted anywhere in the United States. But it is exercised through administrative and not through legislative channels. The provincial president in Germany, the prefect in France and the local government board in England are all administrative agents of the central government; they deal with all cities alike and deal with each local problem on its individual merits. That is obviously a different and far more satisfactory policy than one which deals with cities by acts of legislatures enacted by men who know little about the local problems in hand. So far as central control of municipal affairs is concerned that is the chief difference between American and European practice. See CITY MANAGER; EXECUTIVE; COMMISSION GOVERNMENT; CABINET AND CABINET GOVERNMENT; BOARDS, MUNICIPAL; APPOINTMENTS TO OFFICE; BUDGET SYSTEM, AMERICAN.

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WILLIAM BENNETT MUNRO,
Professor of Municipal Government, Harvard University.

CITIES, European, Government of.—The chief features of city government in the various countries of Europe are (1) a uniform system of charter powers and organization applying to all the cities in each State; (2) a plan of close supervision of city affairs and particularly of city finances, by the central authorities; (3) the continual supremacy of the city council in the direction of municipal policy; (4) the election of the municipal executive by the city council, not by the people; and (5) the placing of experts in charge of all important branches of the city's administrative work.

1. England.—The English city, or borough as it is usually called, is governed under the general provisions of the Municipal Corporations Consolidation Act of 1882 (45-46 Victoria, c. 50), and amending acts. All English cities, with the exception of London, have substantially the same general powers. Their chief organ of government is the borough council, a body which varies in size and is composed of two classes of members. First, there are *councillors* who are elected by the wards of the city, one or more from each ward, for a three-year term. The suffrage in council elections extends to all owners and occupants of ratepaying property. Women are permitted, in certain cases, to vote at these elections though not in parliamentary elections. In the second place, there are the *aldermen*, who are chosen by the councillors either from among themselves or from outside, and who serve for a six-year term. The two classes, councillors and aldermen, sit together in the same chamber and form a single body, the councillors forming three-quarters of the entire membership and the aldermen one-quarter. Between the voting powers and the other privileges of councillors and aldermen there is virtually no difference, except that by custom the aldermen are usually made chairmen of the council's various standing committees.

The mayor of the English city, who serves for a one-year term only but is customarily re-elected, is chosen by the council. He may be selected from among the councillors and aldermen themselves or from outside. His functions are for the most part of an honorary nature. He presides at council meetings but has no special administrative powers. In certain cities which have acquired the right this office bears the title of lord mayor.

The council is the chief organ of borough government, both legislative and administrative. It appoints all the municipal officers except one auditor, and may dismiss any of them at its pleasure. There is no system of competitive civil service appointment in English cities, yet

men of good qualifications are usually appointed to municipal posts and they are not removed without proper cause. The council also enacts the municipal by-laws, determines the rate of local taxes and makes all the appropriations. Its action is also necessary for borrowing upon the city's credit. In some of these matters, however, its action is subject to the approval of a central authority known as the local government board.

Through its standing committees the council also manages the various city departments, such as police, fire, water supply, sanitation, highways and public health. It does not have charge of poor relief, which is entrusted to a special authority, the board of poor law guardians. The routine work of departmental administration is given to the permanent offices, but the standing committee for each department is the intermediate, and the council is the ultimate authority in all matters of administrative policy.

London is in a class apart. The "City" of London, which is only a small area in the heart of the metropolis, retains its ancient and intricate system of government by a lord mayor, a court of aldermen, a court of common council, a court of common hall, sheriffs and chamberlain. The real area of London government is the administrative county of London, created in 1888, and since governed by the London county council of 137 members. This body has charge of main thoroughfares, fire protection, main drainage and other matters of general importance. Within the administrative county there are 28 subsidiary borough governments exercising limited jurisdiction. The police administration of metropolitan London, which includes a much larger area than the county, is under the direct control of a metropolitan police commissioner appointed by the Crown and who is, in turn, under the supervision of the Home Secretary.

2. The German Empire.— Each of the states of the German Empire has its own municipal system although they do not differ widely one from another. That of Prussia, which is larger than all the other states put together, has its basis in the Prussian City Government Act of 1853, and amending statutes of which there have been a great many. In Prussia the dominant local authority is the city council (Stadtversammlung), the members of which are elected for six-year terms by the voters of electoral districts in each city. The suffrage is arranged on what is known as the "three-class system," by which all the voters are grouped into three classes according to the amount of their annual tax payments. Each class of voters in each district elects one councillor, although the number of voters in each class differs widely.

The city council, in turn, chooses the members of the city's administrative board (Stadtrat or Magistrat), each for a 12-year term, and these officials have charge of the various city departments. As a body the administrative board prepares all business for consideration by the council at its meetings and is entrusted with the duty of carrying the council's resolutions into effect. The subordinate officials are appointed by this board, but under strict regulations laid down by the general laws.

The bürgermeister, who is titular head of the city government, is chosen by the council subject to royal approval. Invariably an official of long administrative experience is selected for the post. The bürgermeister has the general oversight of administration, but he has no veto or appointing power, no patronage and no such administrative discretion as is vested in the American mayor.

In the exercise of their respective powers the German city authorities are subject to rigid supervision at the hands of the higher authorities, particularly those of the province in which the municipality is situated.

3. France.— Except as regards Paris the system of local government is uniform throughout the French republic. All municipalities, large and small, with the single exception of the capital, are ranked as communes and governed under the terms of the Municipal Code of 1884. In each commune there is a local council, the members of which are elected by manhood suffrage for four-year terms. This council chooses from among its own members a mayor and one or more assistant-mayors or adjoints, also for four-year terms. These officials, however, retain their membership in the council and continue to sit there, the mayor as presiding officer.

The general direction of municipal policy rests with the council which maintains various standing committees. But the supervision exercised by the national government through the prefects is very strict. The municipal budget, for example, must have this official's approval. The mayor and his assistants have numerous important powers both as agents of the central government and as chief administrative officers of the municipality. The mayor has important powers of appointment; he is in control of the local police and he frames the annual budget, presenting it to the council for adoption. As agent of the central government he is responsible for the local enforcement of the national laws and decrees, for the administration of the system of universal military service as regards his commune, for the enrolment of voters, the reportation of births, marriages and deaths, and for the proper working of the educational and poor-relief systems. Many of these functions are devolved upon the adjoints or upon the secretary of the commune.

Paris, which virtually forms the department of the Seine, is governed by two prefects, the prefect of the Seine and the prefect of police, both appointed by the President of the republic, and by a municipal council of 80 members elected by popular vote, one from each of the 80 electoral districts into which the city is divided. The term is four years. The council's powers, apart from matters of finance, are not extensive. The city, however, is divided into 20 wards or *arrondissements*, each with a mayor who is appointed by the national government and who acts as a deputy-prefect. The whole system is one of rigid centralization.

4. Italy.— The Italian municipal system is based upon the Municipal Law of 1889 and its amendments. Each city has a municipal council of from 15 to 80 members, elected for five-year terms, one-fifth retiring annually. The right to vote is given only to those who pass an educational test and who pay a small amount in taxes. The administrative work is deputed by the council to a small standing committee or *Junta* which it selects from within

its own membership. It also selects from among its own members a *Syndic*, or mayor, who is the chief administrative official of the city and head of the *Junta*. As in France the provincial authorities exercise close supervision over municipal affairs.

5. Austria.— The Austrian system of city government resembles that of Prussia, but with some important differences. The city council is elected by the citizens under a system by which the voters are grouped according to their annual tax payments into four classes. The administrative magistrates are selected by the council from among its own members and so is the bürgermeister. The latter holds office for six years only but is sometimes re-elected. His selection is not valid until confirmed by the emperor, but this confirmation is rarely refused.

6. Other European Countries.— Of the other countries of continental Europe, Spain and Belgium have systems of local government which in their general outlines resemble that of France. In Spain each city ranks as a commune; its organs of government are a city council (*ayuntamiento*), the members of which are selected for a four-year term by the voters, and all male Spaniards above the age of 24 have the right to vote at local elections. The council elects one of its own members to serve as mayor (*alcalde*); but in the largest cities the right to appoint the mayor belongs to the national government. In Belgium the French system of city government has been almost literally followed, except that the mayor or burgomaster is chosen for a 10-year term. Plural voting and proportional representation have also been adopted. French influence is also apparent in the municipal system of Holland. There is an elective council, a board of adjoints (wethouders) elected by the council from among its own members, and a mayor or burgomaster appointed by the Crown for a six-year term.

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WILLIAM BENNETT MUNRO,
Professor of Municipal Government, Harvard University.

CITIES, Water Supply of. See WATER SUPPLY.

CITIES OF THE PLAIN, Sodom and Gomorrah, chief of the five cities which were destroyed by fire from heaven, and their sites overwhelmed by the waters of the Dead Sea.

CITIES OF REFUGE, according to the law of Moses six out of the 48 cities which the Israelites were directed to give to the tribe of Levi, in the division of the land of Canaan among their tribes, were to be set apart as cities of refuge for the manslayer or accidental homicide. The right of avenging murder belonged to the next-of-kin of the murdered man; but the slayer fleeing to one of these cities, three of which were to be on either side of Jordan, the avenger of blood was forbidden to touch him till he stood before the congregation in judgment, when, if he were found to have acted without premeditation or malice, he had a residence appointed him in the city of refuge until the death of the high priest, and was then permitted to return to his inheritance. If the slayer violated this regulation by leaving the city of refuge before the death of the high priest, the avenger of blood might kill him with impunity. The six cities of refuge appointed in accordance with this law were Kedesh, Shechem and Hebron on the west side of Jordan; and Bezer, Ramoth-Gilead and Golan on the east. This law of refuge seems to have been favored by the Levites, to whom it gave a measure of political influence, much in the same way as the privilege of sanctuary did to the monks, abbots and other dignitaries of the Roman Catholic Church; it was consequently interpreted by them in the most liberal way. Maimonides says that all the 48 cities of the Levites had the right of refuge, although only the six were obliged to receive and lodge the slayer gratuitously.

CITIZEN, originally, a member of the body of freemen entitled to share in the government of a *civitas*, or city-state of the ancient type; as the Roman state gradually broadened into the entire ancient world, the citizenship was extended piecemeal for political reasons, till Justinian made it coextensive with personal freedom, and the attribute of all residents of the empire except slaves. With the rise of the miscellaneous modern community, where flux of population, permanent and temporary, is going on, and the mass of people share in the government to a varying extent, the question of its limitations and the privileges it confers have become acute, and that of its legal definition has furnished one of the grounds of a civil war. The definition varies in different countries. In monarchies it is commonly used only of a resident's relation to his municipality, the term «subject» expressing the relation to the state; in republics generally it means a regular member of the community, subject to its ordinances, obligated to its support and defense, and entitled to its protection. In the United States, a complication is introduced by the Federal structure of the government, there being a citizenship of each distinguished from that of the other. The questions arising in this country are therefore: (1) What constitutes citizenship; (2) What rights it confers; (3) How it is acquired; (4) How it can be lost; (5) What are the respective obligations to State and nation.

1. A citizen has been legally defined as «one who owes to the government allegiance, service, and money by way of taxation, to whom the government in turn grants and guarantees liberty of person and of conscience, right of acquiring and possessing property, . . . suit and defense, security in person, estate, and reputation.» In a word, the citizen is one whose lot is cast in with his society, for all social purposes according to his status and means, to fight or pay unless he is a dependent member of a group which fights, pays, etc. This includes women, children, defectives and criminals; and excludes alien residents (see, however, section 3), and Indians living in tribal relations, who are «dependent subjects.» It should be added, however, that for jurisdictional purposes resident aliens are regarded as citizens, and in commercial and business legislation «citizen» is equivalent to «resident.»

2. Citizenship implies civil but not necessarily political rights. The former are alike for all, and are the primary obligation of a government to secure to its citizens; political rights

are endlessly varied and within the discretion of the government. The right of direct share in government is everywhere withheld from minors, convicts and the insane or idiotic, nearly always from paupers, and most generally from women; but these do not cease to be citizens. On the other hand, voting has occasionally been permitted in this as in foreign countries to persons not citizens of a State or municipality, for holdings of property, and could be so again. It was on this distinction that the minority in the Dred Scott case based their dissenting opinion that a slave's lack of political rights did not prevent his being a citizen with a right to sue in the courts; and the government by the Fourteenth Amendment ratified this view, and definitely dissociated civil from political rights.

3. Citizenship may be acquired by birth, every child born on the soil or within the jurisdiction of the United States,— even of resident aliens, except of foreign official representatives, whose residences are assumed to be part of their country's territory,— or of citizen parents traveling abroad, or of its officials resident abroad, being a citizen; or by naturalization; or by succession to a parent's or husband's rights,— the wife of an alien becomes a citizen by his naturalization, or after his death before naturalization if he had previously declared his intention of becoming so; and the children inherit similar rights.

4. It may be lost by formal renunciation, but the abandonment will not be presumed without it, even from a lifetime of residence abroad; but the government, with most civilized governments at present, recognizes full right to change allegiance at will. This was one of the issues in the War of 1812, Great Britain firmly refusing to recognize it; and it was not till 1870 that that country formally admitted that right.

5. Dual allegiance. The nature of the obligations is different: any one may be a citizen of the United States, yet not of any particular State, but not vice-versa; and as the citizenship of the nation is the more universal, so it is the higher sanction. The two could not in fact come into conflict except through an act of secession, which must be fought out, so that the question is academic, as short of that the whole matter would involve a case in the Supreme Court, pending which the question would be in abeyance; but in case of forcible resistance of a State to a decree of the nation, the citizen's first allegiance is to the latter. Further than this, however, the national government cannot go beyond the scope of its reserved powers; and a State can go very far in the direction of abolishing even the civil rights of its citizens under the shelter of this flexible permission. It should be noted that the right of citizenship is totally unconnected in essence with the right of suffrage or the elective franchise. The former is an elemental right of all born among, or who have cast in their lot with, a civil society; the right to the protection of its laws and its strength, to a share in its benefits and its charities. The latter, a right to share in the governmental management of a society, is a mere question of the best machinery of management, and dependent on the fitness or power of individuals or classes to help guide that machinery. The unfit or weak are just as much citizens as the fit or the strong, by natural right; women and minors, defectives and criminals, have the fullest right to claim the protection of the laws, by themselves or their natural or appointed guardians. The suffrage is only a substitute for a battle, assuming that the larger body could outfight the smaller; and admission to it lies in the discretion of the fighting body. (See ALIEN; CITIZENSHIP IN THE UNITED STATES; NATURALIZATION). Consult Sheldon, W. L., 'Citizenship' (Chicago 1905); Van Dyne, F., 'Citizenship of the United States' (Rochester 1904); Wise, J. S., 'A Treatise on Citizenship' (Northport 1906).

CITIZEN, The. A comedy by Arthur Murphy, performed 2 July 1761, at the Drury Lane Theatre, and printed in 1763. It is founded in part on Destouche's 'Fausse Agnès.'

CITIZEN KING, The. A title applied to Louis Philippe, king of the French, 1830–48.

CITIZEN OF THE WORLD, the signature of Oliver Goldsmith's 'Letters from a Chinese Philosopher residing in London, to his friends in the East.' The work was published in 1762.

CITIZENS' INDUSTRIAL ASSOCIATION OF AMERICA, The. A national federation of local employers' associations, citizens' alliances and State and national organizations representative of business interests, organized as the culminating step in the movement for the organization of employers in 1903. Nearly all the large cities, and scores of the smaller ones, during the months following the anthracite strike of 1902, became the centres of considerable agitation on the labor question, and from 400 to 500 local associations sprung into existence for the purpose of combating what was termed the lawless aggressions of organized labor. The membership of some of these associations was confined to employers, while others, which adopted the general name of alliances, admitted professional men, and even employees, into their ranks. In cities like Chicago, Saint Paul, Omaha, Kansas City, Saint Louis, Detroit, Cincinnati, Louisville and New York, employers associations were formed, while in Denver and all over Colorado and many other parts of the West, as well, also, in the smaller towns of the Central States, the alliance was the most popular form of organization. In response to a call issued by a number of the prominent leaders in the employers' movement, a convention was held in Chicago, 29–30 Oct. 1903, which was attended by nearly 300 delegates, who came from all parts of the United States and Canada, cities as far apart as San Francisco, New Orleans, Montreal and Minneapolis being represented. The name of the Citizens' Industrial Association was considered as being inclusive in meaning of both employers' associations and citizens' alliances, and was selected by the convention for the new organization. The purposes, as set forth in the constitution adopted, were those of law enforcement, the maintenance of individual liberty, the securing of industrial peace and the perpetuation of free competitive conditions in industry. The organization stood for the open shop and no restriction of output. Its work was largely confined to that of educational propaganda, and it maintained a publication bureau for this purpose. It did not interfere in any respect with the internal government of its constituent associa-

tions, and the action of its convention or executive committee was advisory and not obligatory upon its members. The Association formed a central source of information for its members and a directing agency in matters of national legislation in which the associations generally were interested. In the contest in Congress over the eight-hour, the anti-injunction and similar bills, which were fathered by organized labor, the Citizens' Industrial Association took a most active part. The National Association of Manufacturers was a member and one of the principal elements of support in the newer organization. The Association has over 500 local societies throughout the United States and is represented by *The Square Deal,* a periodical devoted altogether to its interests.

CITIZENSHIP AND EDUCATION. The idea that schools and colleges should train for citizenship is one that in a measure depends upon a theory of the state. If the individual exists for the state, then there is no doubt but that any system of education must train the individual in all ways that serve the best interests of that state, and that the individual must be forced to follow it. On the other hand, if the state exists for the benefit of the individual, then it is less clear to the average mind that the individual should be forced to receive an education that he does not wish to take, or that his own freedom of action mentally or physically should be interfered with. Between these two extremes there exists a third theory that as the state came into existence to serve the best interests of those in it, the individuals who form it should be willing to do everything in their power to conform to those rules and regulations which will make the state their most effective agent for the purposes for which it grew up. If the state is to be more effective by virtue of having the individual intelligent, then he must get an education; if the state is to be more efficient because the individuals are healthy and strong, then the citizen must take care of his health and train his body. In a democracy the majority of the people determine what is best along these lines and the minority has to abide by the decision. In an autocracy it is those in power who so determine and the individuals must conform as long as the few have the force necessary to compel obedience.

The idea that the individual should be trained or educated along certain lines because of the best interest of the state is not new, though its strength has varied much throughout history, and among peoples even at the same period of history. The Spartans among the Greeks represented the extreme view of the theory that the individual existed for the state, and their educational system was devised along those lines. On the other hand the Athenians represented the via media, or the third theory as presented above, and their educational system was worked out accordingly. The Romans tended strongly to the Spartan ideals and regarded the Athenians as unpractical and visionary. After the barbarians had overrun the Roman Empire and the idea of the participation of the citizen in the active work of the state had died out during the Middle Ages, when feudalism held sway, education, except for the purposes of the Church, was generally non-existent. In a way the Church took the place of the state, and the theory that the individual clergyman existed for the good of the Church was perpetuated.

It was only during the philosophical theorizing of the 18th century that the idea of giving the individual an education because of his interest to the state began to be revived. The democrats of the French Revolution soon realized that people enfranchised, but without an education, were a dangerous element and would soon lead the ship of state on the rocks of anarchy and thus back into the control of a despot. It was for this reason that Danton in one of the best of his speeches declared: "After bread, education is the first need of the people." It was thus that democracy was fundamentally responsible during the whole course of the 19th century for the demand that the people be educated for the sake of the safety of the state. An ignorant electorate meant eventually the destruction of a democratic state.

It was from a different point of view that the educational reformers Pestalozzi, Herbart and Froebel approached the question. They were, quite naturally, because of the nature of their civil and economic environments, more impressed with the idea of the importance of education as a means for the economic and social betterment of the individual rather than as a means for preserving the state. It is now to be observed, however, that the two go hand in hand, for the well-to-do citizen is a good citizen. The education which has brought him economic prosperity and social recognition also tends to make him interested in the preservation of the state.

It remained particularly for the fathers of the American republic like Washington, Jefferson and Madison to lay stress on the idea that the safety of the republic lay in the education of the people. In 1786 Jefferson wrote to Washington: "It is an axiom in my mind that our liberty can never be safe but in the hands of the people themselves, and that, too, of the people with a certain degree of instruction. This is the business of the state to effect and on a general plan." Washington in his message to Congress in 1790 wrote: "Knowledge is in every country the surest basis of public happiness. In one in which the measures of the government receive their impression so immediately as in ours, from the sense of the community, it is proportionally essential." "Whether this will be best promoted by affording aid to seminaries of learning already established, by the institution of a national university, or by any other expedients, will be well worthy a place in the deliberations of the Legislature."

Madison wrote: "A popular government without popular information or the means of acquiring it, is but a prologue to a farce or a tragedy, or perhaps both." "The best service that can be rendered to a country, next to giving it liberty, is in diffusing the mental improvement equally essential to the preservation and enjoyment of that blessing."

These three men set by their words the standards which not only the United States but all democracies had to follow for the sake of self-preservation. Though progress along such lines was slow in the first half of the 19th century, in the latter half, the state has entered

into fields of instruction little dreamt of by the fathers of the constitution and which would probably have been condemned by them as tending to go altogether too far in interfering with the liberty of the individual.

Once grant, however, that the state for its best good has the right to take steps along educational lines which serve for its preservation and there is no limit to the extent to which it may go. In a democracy perhaps little harm will come from such a doctrine, for the people are in the end the determining factors of the length to which interference with the individual is to go. In an autocratic government, however, the dangers of such a doctrine have become only too obvious. Under the leadership of an unscrupulous sovereign and military clique the educational system of the state is devised to make good soldiers who are to do the will of the rulers. Under such a system, unlike conditions existing in a democracy, the people can exercise no restraining hand and the citizens are debauched morally and mentally so that they conduct themselves like obedient slaves. Trained under such a system they do not have any minds of their own, but are shaped to do the bidding of a tyrant.

The first attempt to give to the people an absolutely uniform education over a vast area was connected with religion. The Church and state combined in the Middle Ages to compel every citizen to receive uniform religious doctrine not only in one state, but all over Europe. The salvation of the state was thought to depend on religious uniformity. As James I of England said: "No bishop, no king." The security of the state was deemed to rest on a religious instruction which all must receive. He who refused it put himself outside the pale and was to be regarded both as a heretic and an anarchist — a fit candidate for the stake or the block.

The states of the world have gradually dropped the idea that the safety of the state is bound up with religious education, but in its place the theory of the safety of the state has dictated the institution of a system for the instruction of youth, not only mentally, as was originally intended by Washington, Jefferson and Madison, but physically, morally, vocationally and in an infinite variety of subordinate ways. The justification for such instruction in a democracy is not hard to find. If it is to the best interest of the state that its people should be trained mentally, it is also necessary that they be trained physically. Citizens that are weak physically are a menace to the state. The state has the right to step in and say that its citizens shall not be permitted to become physical weaklings. For this purpose it can interfere with the individual to see that he gets the proper physical culture, that he lives hygienically, that he is vaccinated, that he conforms to good physical health laws and subjects himself to food regulations. The same also holds true for moral education. Morally debased people are a danger to the state and therefore the state may step in to give moral instruction. Citizens who are poorly prepared to earn their own living are also a menace to the state and on the same ground, here as elsewhere, it may for its own safety's sake see to it that the citizens are properly trained to follow vocations that will prevent them from becoming dependents.

For all of these purposes the curricula, not only of public schools but of private schools, must answer. In them must appear the necessary courses and the properly trained teachers.

Such, briefly stated, is the somewhat common theory of citizenship and its relation to education. How far the state will go along these lines only the future can reveal. It will go in a democracy as far as the people wish it to, subject to constitutional limitations, but even the latter may be broadened, if the people see fit. In an autocratic state there are no limits except those found in a revolutionary overturn of the state by the people who feel that the state is going too far.

At the present time (1918) the most progressive states are insisting that their minor citizens must learn reading, writing and arithmetic and are compelling them to attend school to do so. From that minimum of the literary and mathematical, various states have added other subjects which the pupils must study: hygiene and physiology, history and civics, geography and natural science, music and drawing, trades and vocations, physical culture, military drill and religion and morals. In order that the minor may not escape such education he is forced to attend school up to a certain age and no one is allowed to give employment to him before that time. Even if he then goes to work, he is, by the law of certain states, forced to attend for a time certain continuation or evening schools to make himself better prepared for citizenship — political, social and industrial.

The present tendency of states is to increase the age limits for compulsory education, to add more subjects that must be taken for the sake of good citizenship and even to force adults to make up their deficiencies. In the United States trades and vocations have been recent additions, and physical culture and military drill are making great strides. Subjects present in European schools for generations, but still generally absent in the schools of the United States, are those of religion and morals. A campaign to introduce the latter without the former as essential to good citizenship and the safety of the state is being carried on.

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JAMES SULLIVAN,
New York State Historian.

CITIZENSHIP IN THE UNITED STATES. All persons who are within the territorial jurisdiction of a state owe an allegiance to it according to the maxim *protectio trahit subjectionem et subjectio protectionem,* and the existence of this fealty thus imposed is shown in the fact that, according to the public

law of all modern constitutionally developed states, even aliens may be held guilty of treason, if, within its territory, they plot or commit acts against the welfare and existence of the local sovereign. In a narrower sense of the word, however, only those persons are termed citizens or subjects* of a state who owe to it a primary allegiance and one that continues wherever the person may be and may be cast off only with the consent of the state concerned.

Viewed from the standpoint of international law, the citizen body of a state consists of all those persons from whom the state claims this primary and permanent allegiance. These persons, sometimes termed nationals, constitute, so far as other states are concerned, one homogeneous body. They are all equally entitled to the protection of their own government wherever they may be.

When, however, we regard the *civitas* or body-politic of the state from the domestic or constitutional point of view, it is found that its members may be divided into as many different classes, with as many different public and private rights, as may be deemed just and expedient by those who fix the public policy of the particular state in question.

All civilized states make a distinction between natural or native born, and naturalized citizens. The native-born citizen is one who has this status imposed upon him by reason of the nationality of his parents or parent, or the locality in which he is born; the naturalized citizen is one who, originally in allegiance to one state, is granted citizenship in another state.

Every sovereign state determines for itself the circumstances which shall be recognized as creating natural or native-born citizenship, as well as the conditions under which an alien may be admitted to membership in its citizen body. Many states adopt as their general principle the *jus sanguinis,* according to which the children take the citizenship of the father or, if illegitimate, of the mother. Other states accept the rule of *jus soli,* according to which a person becomes a citizen of the state within whose territorial limits he is born. This latter rule is constitutionally obligatory upon the United States, the Fourteenth Amendment to the Federal Constitution providing that "all persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the State wherein they reside." This rule, though thus explicitly stated only in 1868, was declaratory of the rule which had been previously applied. The qualifying clause "and subject to the jurisdiction thereof" was inserted to cover the cases of children of foreign representatives or other persons entitled to extraterritorial rights while in the United States. So absolute, otherwise, has this rule of *jus soli* been declared to be, that children born in the United States of Chinese or Japanese parents are American citizens even though their fathers and mothers are aliens who, under statute law, cannot obtain naturalization.

The rule of *jus sanguinis,* however, also finds some application in the United States for the constitutional mandate does not operate negatively to the effect that only those persons shall be deemed natural citizens who are born within the jurisdiction of the United States. Thus children born to American parents while abroad are deemed natural citizens if, during minority, they return to the United States with the intention of residing there permanently.

The conditions under which aliens may become naturalized American citizens are fixed by acts of Congress and have varied from time to time. They are now mainly determined by the laws approved 25 June 1910 and 30 June 1914. These statutes extend the rights of naturalization only to white persons or to those of African nativity or descent. Thus, among others, the Chinese and Japanese do not come within their provisions. The naturalization of Chinese is, indeed, expressly prohibited by a law enacted in 1882.

In order to be naturalized, the alien, being 18 years of age or over, must first file a declaration of bona-fide intention to seek American citizenship and to renounce forever all allegiance and fidelity to any foreign prince or state; and then, not less than two years after, file his petition, signed in his own handwriting, verified by two credible witnesses, who are themselves citizens of the United States, that he has resided in the United States continuously for at least five years immediately preceding the date of his petition, and at least one year in the State or Territory in which he seeks naturalization. Besides various facts of date and place of birth, date and place of arrival in the United States, name and country of nativity of his wife, names and dates of birth of his children, if any, the petitioner must show that he is not a disbeliever in or opposed to organized government, that he does not practise or believe in polygamy and that he can speak the English language.

Aliens of 21 years of age or more who have been honorably discharged from the armies of the United States, whether regular or volunteer, or who have served five consecutive years in the United States navy or one enlistment in the marine corps, may be admitted to citizenship without having previously made a declaration of intention.

Naturalization is a judicial act and may be granted by the Federal District Courts, or by any court of record in any State or Territory which has a seal and clerk and a jurisdiction in law and equity without limit as to the amount in controversy.

Naturalization is granted to aliens without reference to any permission to expatriate themselves which they may or may not have received from the state of their original allegiance. Thus when the right of expatriation is not recognized by the original state, a double citizenship is created. Dual citizenship also arises when the same person is claimed by two states, the one by reason of the citizenship of his parents, the other by reason of birth within the territorial jurisdiction.

It has been declared by the United States courts that the naturalization of a father operates as a naturalization of his minor children if they are dwelling within the United States. In the same case (Boyd v. Nebraska) it was held that the declaration by a father of

*Citizens and subjects are, juristically speaking, interchangeable terms, although it is more usual to designate as subjects those who owe allegiance to a state with a monarchical form of government.

an intention to seek citizenship gives to his minor children, who reach their majority before his naturalization is completed, an inchoate citizenship which, however, they may, upon coming of age, repudiate.

In the constitution it is provided that only native-born citizens are eligible for election as President or Vice-President of the United States. By statute it is declared that, except for this disqualification, naturalized citizens shall have all the rights, privileges and protection that are enjoyed by native-born citizens. In fact, however, in those states which do not recognize a full right upon the part of their citizens to expatriate themselves, the United States is not able to extend to the citizens of those states who have become naturalized American citizens that full degree of protection which it is able to assert and effect with regard to its own native-born citizens.

Citizenship may be lost as it may be acquired, in various ways. Everywhere women lose their citizenship by marriage to aliens. By a recent act of Congress women may, however, resume their American citizenship upon termination of the marital relation through the death of the husband, divorce or otherwise, by returning to the United States and residing therein or, if continuing to reside abroad, by making a declaration before an American diplomatic or consular representative of their intention to resume their American nationality. In some countries citizenship is lost by the acceptance of office or service under a foreign government but according to the law of the United States this results only in case the acceptance of office involves the taking of an oath of allegiance to the foreign government. By Act, 5 Oct. 1917, however, it was declared that American citizens who, since 1 Aug. 1914, had sworn allegiance to a foreign State which was at war with a State with which the United States is at war, in order to enlist in the armed forces of that foreign State, and was honorably discharged therefrom, may reassume American citizenship. In others, it is lost by the acceptance of a decoration from a foreign government, by desertion from the military or naval service or by judicial condemnation for certain crimes; but American law does not provide for the loss of citizenship through any of these acts. Again, according to the law of various European states, citizenship may be lost by long residence abroad even if not followed by naturalization in a foreign state, but according to American law and practice long and continued residence abroad has no other result than to create a presumption of intention to abandon American nationality,—a presumption which may be overcome by the presentation of evidence to the contrary. Thus Secretary of State Evarts in 1879 stated that "a citizen of the United States may be absent from this country for an indefinite period for purposes of business, education or pleasure and so long as he does no act, or assumes no obligation inconsistent with his native or acquired citizenship in this country, he is not held under our laws to have forfeited any of his rights as a citizen of the United States." It was in accordance with this principle that the United States government in 1904 assumed the protection of an American citizen named Perdicaris, who had been kidnapped by a Moroccan bandit, this notwithstanding the fact that Perdicaris had lived abroad for 34 years. Likewise according to American law and practice loss of citizenship in the case of native-born citizens results ordinarily not from long residence abroad but from naturalization by a foreign government. In the case of naturalized citizens, however, the presumption from residence abroad of intention to abandon American nationality is much greater. Thus by the Act of Congress of 2 March 1907, it is declared that "when any naturalized citizen shall have resided for two years in the state of his origin, or five years in any other foreign state, it shall be presumed that he has ceased to be an American citizen—provided, however, that such presumption may be overcome on the presentation of satisfactory evidence to a diplomatic or consular officer of the United States."

Leaving now the distinction between native-born and naturalized citizens we come to consider a fundamental constitutional distinction which, in the United States, is made between Federal and State citizenship. This is a distinction arising out of the Federal form of the American government. All persons, not aliens, who reside within one of the States of the Union have a double citizenship; they are citizens of the State in which they reside and are also citizens of the United States.

There was for many years an uncertainty whether, as a constitutional proposition, State citizenship was primary and the basis upon which Federal citizenship rested, or vice-versa. The result of the Civil War fixed in fact, and the adoption of the 14th Amendment established in law, the priority and supremacy of Federal citizenship. However, the distinction between the rights and obligations attaching to these two citizenships has been in no wise destroyed. This was made plain by the Supreme Court in the famous Slaughter House cases, in which it was held that the provision of the 14th Amendment that "no State shall make or enforce any law which shall abridge the privileges and immunities of citizens of the United States," has reference only to those privileges and immunities which are peculiar to national citizenship, as, for example, the right to use the mails, to resort to the Federal courts, to go to the seat of Federal government, to receive protection while abroad, etc.

Another constitutional classification of citizens of the United States which has become especially important since the Spanish-American War is that between the citizens of the States of the Union and of the territories which are regarded as having been "incorporated in the United States," and those persons who are natives of those annexed territorial possessions, such as the Philippine Islands,* who, while citizens of the United States in the international and broader sense of the term, are nevertheless not deemed to be citizens of the United States in a narrower constitutional sense, and therefore are not entitled to certain special rights which are regarded as flowing from the more special and privileged status.

*The Hawaiian Islands have the status of an "incorporated territory of the United States." By the act of 2 March 1917 the inhabitants of Porto Rico were declared by Congress to be citizens of the United States.

Another constitutional class of citizens which deserves mention embraces the Indians. Although under its sovereignty and jurisdiction, the United States for many years saw fit to regard the Indians, or at least those who maintained tribal relations, as constituting bodies-politic independent of the States of the Union, and separate from, though dependent upon, the United States; yet with these tribes the United States entered into treaties with respect to the rights which their members should enjoy and the control to which they should submit. For some time now, however, this quasi-international attitude has been abandoned, and the principle put into full operation that the Indians in all their private and public rights are absolutely subject to such statutory control as Congress may see fit to provide. The Indians have never been treated, however, in any full constitutional sense as citizens although they owe full allegiance to the United States. As nationals they are, when abroad, entitled to the protection of the United States, and when desiring to leave the limits of the United States they can obtain from the Department of State a paper which partakes of the nature of, even if formally it is not designated as, a passport. In all cases, whether living within those restricted areas known as reservations or not, whether maintaining tribal relations or not, Indians remain subject to the direct control of the Federal government. And it has been held that the Indian does not and cannot become a citizen of the United States simply by leaving his tribe, abandoning his reservation and taking up his residence and leading a civilized life within a State. On the other hand, it is within the power of Congress at will to impose citizenship upon such Indians as it pleases. This refusal to permit an Indian by his own will to obtain citizenship, and the imposition upon him of such a character without his consent, are illustrations of the principle that citizenship is not a right which inheres in the individual, but a status created by the sovereign will of the State.

The rights which aliens may enjoy within the United States are dependent upon the general principles of international law and comity and upon the provision of such treaties as the United States may have entered into with the native states of the aliens concerned. It is thus possible that aliens within a State of the Union may be entitled to rights and privileges which that State itself may be unwilling to recognize, and this too with reference to matters which, so far as American citizens are concerned, lie wholly within the legislative discretion of the States. Just how far a Federal treaty may constitutionally go in fixing the rights of aliens within the States has been a matter of considerable controversy; and thus, both as a matter of law and as a matter of policy, there have arisen such problems as those connected with the right of Japanese, resident in California, to take title to and hold real estate, and to attend the public schools of the State.

With reference generally to citizens and non-citizens, that is, citizens and resident aliens, it is to be observed that throughout the civilized world there is an increasing tendency to make the distinction of little significance within the field of private rights, and within several of the States of the American Union even the right of suffrage has been extended to those aliens who have become domiciled and have declared their intention of becoming citizens, that is, as it is called, have taken out their "first papers." See ALIENS; ALLEGIANCE; NATIONALITY; NATURALIZATION; NATURALIZATION LAWS; SUFFRAGE.

W. W. WILLOUGHBY,
Professor of Political Science, Johns Hopkins University.

CITRANGE, a hybrid between the common orange and the hardy trifoliate orange, *Poncirus trifoliata.* This hybrid was first produced in 1905, and several varieties are now grown in the southern United States. The trees are very resistant to cold, being able to withstand temperatures as low as 15° or 10° F. without injury. The fruits are similar to those of the common orange, 1 to 4 inches in diameter. They are not grown commercially, but are planted for home use in regions of the South too cold for growing the common orange.

CITRIC ACID ($C_6H_8O_7,H_2O$), a very widely distributed acid, present in most common fruits, such as gooseberries, currants, lemons, citrons, cherries and many others. It is also a constituent of the sap of many plants. It was first separated and distinguished by Scheele in 1784. It is generally prepared from the dark treacle-like concentrated lemon juice imported from Sicily, Bergamot juice from Calabria or lime juice from Montserrat and Dominica. The process consists of filtering and neutralizing with chalk and quicklime, by which citrate of calcium is precipitated. This, by decomposition with a slight excess of sulphuric acid, gives the acid, which is then purified by repeated crystallization. The theoretical yield is from 51 to 64 ounces of commercial citric acid per gallon of juice, but this is seldom reached in practice. Several improvements have of late been introduced, both in preparing the crude lemon juice for exportation and in the subsequent purification and crystallization of the acid. As found in commerce citric acid is sometimes adulterated with tartaric acid which is readily detected by the brown coloration in the presence of potassium dichromate. Citric acid is white when pure; it crystallizes in two forms, one belonging to the trimetric system is the common form, and in it the acid contains one molecule of water, as indicated in the formula given above. The other form contains half the quantity of water. The ordinary crystals effloresce in the air in a warm room. Citric acid has a pleasant sour taste. It dissolves very readily in water and is soluble in alcohol, but insoluble in ether. When heated it undergoes decomposition and yields aconitic, itaconic and citraconic acids, along with other products. It is acted on by nitric and sulphuric acids and by other reagents, yielding a variety of decompositions and derivatives.

Citric acid combines with the metals, forming citrates. They are crystalline salts and many of them are soluble in water. Crude citric acid is largely employed by the calico-printer as a resist and as a discharge.

Citric acid and the citrates are used in medicine as cooling drinks, as antidotes to alkalis and for the purpose of rendering the urine alkaline, thus overcoming abnormal acidity. Cit-

rates of magnesium are used as laxatives and cathartics.

CITRON, a tree (*Citrus medica*) related to the lemon, with a large lemon-like fruit having a thick peel and a small amount of very acid pulp. It is grown chiefly in the Mediterranean regions and large amounts of the fruit are preserved in brine and shipped to the United States, where the peel is candied and used for confectionery and culinary purposes. The trees are grown to a small extent in southern California. The name citron is also applied to a small variety of the watermelon which is used for preserving.

CITRON-MELON. See WATERMELON.

CITRONELLA OIL, an oil obtained from a kind of grass (*Andropogon nardus*), cultivated at Singapore and in Ceylon. It is used for scenting soaps. Other species of the same genus and some other allied genera also yield essential oils.

CITRONELLE, sĭt-rō-nĕl', Ala., a village in Mobile County, where on 4 May 1865 the last Confederate army east of the Mississippi surrendered to the Federal troops under General Canby.

CITRONWOOD, or CITRUS-WOOD, the most costly furniture wood of Roman antiquity, usually regarded as derived from *Biota* (*Thuja*) *orientalis,* or possibly from *Callitris quadrivalvis,* allied coniferous trees, both popularly known as *Arbor vitæ* (Oriental and African). Cicero is said to have paid an enormous sum for a table of this wood.

CITTÀ VECCHIA, chēt-tä vĕk'kyä, a fortified city of Malta, formerly the capital, near the centre and almost on the highest point of the island, seven miles southwest of Valetta, which became the capital in 1570. Pop. 7,500.

CITTADELLA, chē-tä-dĕl'lä, Italy, city in province of Padua, compartimento of Venetia, 30 miles northwest of Venice. It contains beautiful churches and botanical gardens. Its modern industries are the manufacture of paper, cotton, woolen goods and linen. It was founded in 1220, as a protection against Treviso, and has still retained its walls, tower and moat. Pop. 11,332.

CITY (Latin *civitas*). The Greeks and Romans distinguished a city from a town, or mere assemblage of people living together under municipal laws, as an independent community or state possessing sovereign authority, and including any portion of the surrounding territory the inhabitants of which possessed the rights of citizenship, but excluding conquered or dependent territories. Thus, Athens, Rome, and Carthage were all both towns and cities in different senses. In Europe the word city came to have two meanings, the one civil, the other ecclesiastical. The civil meaning corresponded with the Roman sense, in which the great Italian republics and the German free cities during the period of their independence corresponded with it. The fluctuations in the fate of such cities must necessarily have caused the word to lose the sense of territorial independence, and this change would be promoted by the rise of rivals to them in other respects having no such claim, so that in modern times a city has come to signify merely a town holding from extent of population, favorable situation or other causes, a leading place in the community in which it is situated. The ecclesiastical sense of the term city is a town which is the see of a bishop. This seems to be the historical use of the term in England, and still possesses some authority there, but in general use it has been superseded by the wider one. In our historical retrospect we take the term in its least restricted sense.

The origin of cities belongs to the earliest period of history. According to Moses, Cain was the first founder of a city, and Nimrod built three, among which Babylon was the most important. The Jewish tradition is that Shem erected the first city after the deluge. At the commencement of society the form of government was patriarchal. The ruler was the head of the family or clan. Relationship, the innate wish of men to live in society, and more perhaps than both these causes, the necessity of providing means of defense against more powerful clans, brought together separate families to one spot. The fertility of the East also afforded facilities for men to give up the rambling life of nomads and to form permanent settlements. These settlers began to barter with those tribes who continued to wander with their herds from place to place. Thus cities sprung up. These were then surrounded with walls to prevent the inroads of the wandering tribes. The bond of connection between their inhabitants thus became closer, and their organization more complete. As by degrees the chiefs of these family-states died away, the citizens began to elect the most able or most popular men for magistrates, without respect to birth or descent. Thus political institutions began to assume a systematic character.

The earliest form of government succeeding the patriarchal state was probably monarchical. In this the religious, paternal and political authority remained rudely mingled. When conquest extended the limits of these early kingdoms the authority of the king was weakened, his connection with the different parts of his dominions became imperfect and the progress of civilization was promoted almost solely by the growth of the cities. These gave rise to the division of labor, the refinements of social intercourse, the development of laws caused by the conflicting interests of many people living close together, the idea of equality of rights, the diminution of awe for a distant monarch, the growth of patriotism springing from the sense of advantages enjoyed and the exertion necessary to maintain them. These were the salutary consequences of the establishment of cities.

Under the mild sky of Asia, Africa, Greece and Italy cities were built first, and in the greatest number. The Phœnicians and Egyptians particularly distinguished themselves by the erection of cities, which soon attained a high degree of wealth, and consequently of civilization. The Egyptians considered their city of Thebes older than any of the Greek cities; and Pliny says that Cecropia, said to have been erected in Attica by Cecrops, 1582 B.C., and afterward called "Athens," was the oldest city of Greece. Heeren justly remarks that the rise of cities was the most important source of the republicanism of antiquity. This is particularly true of Greece. In fact cities

are, by their very nature, of a democratic tendency. Several confederations of cities existed in the ancient world; for instance, the Phœnician, consisting of the cities of Tyre, Sidon, etc., and the Achæan league, formed by the most important cities of Greece, in order to strengthen themselves against the power of Macedon. Under Augustus and his successors the Romans began to establish colonial cities in Germany, having done the same long before in Gaul, Spain, Africa, etc. In Switzerland they first erected cities about 70 A.D., which, however, were mostly laid waste by the Alemanni, and subsequently rebuilt under the government of the Franks (496 A.D.). The Germans, accustomed to a wild, rambling life, did not show any disposition to live in cities until Charlemague labored to collect them together in settled abodes from his desire to civilize them. Henry I distinguished himself particularly in this way, and on this account has been called by some "Henry the City-builder" (*der Stadtbauer*). He gave the cities great privileges, in order to induce his subjects to live in them, and thus laid the foundation of that power which at a future period contributed most to break down the feudal system. In many cities Imperial castles were erected to protect the inhabitants, and the insupportable oppressions and even cruelties exercised by the feudal lords upon their peasants, or by the wandering knights and robbers, drove many people into the cities. The attacks of the neighboring lords gave firmness to their union, and compelled them to cultivate their resources. Commerce and the various arts and trades were soon cultivated within their walls, and their wealth and respectability increased. They soon became sensible of the want of a better system of laws and political administration than prevailed around them, and the principle of equal rights and laws was quickly developed.

One of the most important remnants, if not the most important, of the great fabric of ancient civilization, was the cities of Italy. In spite of their bloody contests with each other, and the vices of an oligarchical government, Europe is mainly indebted to them for the cultivation of the commercial spirit, together with the toleration and love of liberty, which, under the most unfavorable circumstances, it tends to foster, and for that ardor in the cultivation of arts, science and literature, which has always distinguished the best periods of Italian history, and from which the general revival of learning in Europe, called the Renaissance, took its rise. Under the reign of Conrad III (1138–52) the cities of Lombardy, and particularly Milan, which stood at their head, had acquired a high degree of wealth and power, and had formed themselves into a confederation. The struggles between the emperors and these cities form one of the most important portions of the history of the German empire and of Italy. Frederick I in vain demolished the powerful city of Milan. It was soon rebuilt, and the cities of Lombardy, in alliance with the Pope, obliged the emperor to conclude with them a very disadvantageous peace at Constance. Two other confederations of cities, highly important, were formed during the interregnum of the German empire, between 1256 and 1272. One of them was the powerful Hansa, or Hanseatic League (q.v.), the other the confederacy of the High German and Rhenish cities, from the foot of the Alps to the mouth of the Main, established by Walpode of Mentz in 1255. A similar confederacy, and a very important one, was that of the Suabian cities, instituted in 1488 to repel the outrages of the feudal lords and knights. The cities of the Netherlands, from their central position between France and Germany, exercised a powerful influence on the growth of civilization and political liberty in Europe. Their favorable situation and the enterprise of their inhabitants early gave them great wealth and power. The democratic spirit, ultimately carried to the greatest height in Holland, was earliest manifested in the towns of Belgium, which began in the 12th century to show a turbulent disposition, and by frequently leaguing themselves with the enemies of their feudal superiors extended their political privileges, and acquired at times a premature independence, which, though ultimately extinguished in the spirit of nationality, contributed not a little to the breaking up of the feudal system (q.v.). In Spain municipalities were established at an early date. Leon received a charter in 1020, Sepulveda, Lograno, Sahagun and Salamanca followed soon after. The constitution of the Spanish towns approached more nearly to the ancient idea of a city than was common in other large states of Europe, in this resembling the Italian cities. Their constitution was extremely democratic, and they ruled over a large extent of surrounding territory, which they were bound to defend. Deputies from the towns were admitted to the Cortes in the 12th century (1167 and 1188). The love of liberty rose high in these ancient Spanish cities, but from the isolation of the Iberian Peninsula they exercised little influence in Europe, and they soon lost their power and importance, most of them by the end of the 15th century having ceased to send their representatives to the Cortes. By degrees the cities acquired in the different countries of Europe the right of representation in the legislative bodies; and wealth, industry, knowledge and equal laws spread from them through Europe. But the cities of Lombardy, though still flourishing and wealthy, had fallen, for the most part, under the rule of single families; their republican governments vanished, and their confederation was dissolved. The association of German cities experienced a similar fate. By the Peace of Westphalia the princes of the German empire were declared sovereign powers, and the more their authority increased the more did the relative weight of the cities diminish. These had formerly suffered from the oppressions of the feudal lords. They were now the victims of the policy of the neighboring princes, whom envy often led to adopt the most unwarrantable measures against the cities, many of which had lost their independence before Napoleon dissolved the German empire. He took away the privileges of those which remained free; and the Congress of Vienna restored freedom to Lübeck, Hamburg, Bremen and Frankfort, only because the different powers could not agree to whom they should be assigned. At the same time Cracow was declared an independent city, with a republican form of government.

Cities, as we have seen, naturally develop the democratic principle, and on this and several other accounts are to be considered among the

firmest supports of liberty. Well-organized municipal institutions, in which the government is in the hands of the citizens, afford continual nourishment to the spirit of freedom throughout a country.

In the United States a city is an incorporated municipality, usually governed by a mayor, aldermen and common council. In many of the States, especially the Eastern, the number of inhabitants required for legal municipal incorporation is 10,000. In several of the Western States a much smaller number is required. A village or town of 10,000 or more inhabitants is not obliged to become a city, and in several cases places of 20,000 and 30,000 have preferred for local reasons to remain under village government. In the United States cities are generally the outgrowth of villages; one village expands into a town with a population sufficient to assume the duties of a city; but in several instances, villages near each other have united to form a city, and sometimes cities nearby have united in one municipality,

The 10 largest cities in the world are London, New York, Paris, Tokio, Chicago, Berlin, Vienna, Petrograd, Philadelphia and Moscow. The cityward movement is common to all civilized countries. Not only the great industrial nations — the United States, Great Britain and Germany — but new countries holding vast unoccupied territories, such as Canada, Australia and New Zealand, have all felt the influence of the tidal movement that has set in toward urban centres. The explanation is plain and simple. The improvement in transportation facilities, "the inclusion of one farm task after another — weaving, toolmaking, soapmaking, slaughtering — in the scope of the urban factory; the improvement of farm methods and farm machinery, making it possible to do the work still left to the farm with fewer hands; the encouragement given to the city as contrasted with the country, with tariff favors; the increasing array of financial and commercial middlemen required as communities become less self-sufficient and more dependent on world-wide exchanges, rendered the shifting inevitable." This migration to the cities has been accompanied by great congestion at the centre: in the East Side of New York 600,000 persons are huddled together on 1,230 acres; but within recent years there has been a movement in many large cities of factories and residences to the suburbs, when the problem becomes one of transportation from the business centre to the outlying residential districts. The most striking example of a city centre entirely given up to business interests is seen in the historic city of London, which during the day throbs with busy life, and in the night time becomes a city of caretakers.

In 1790 but 3.14 per cent of the inhabitants of the United States lived in cities; New York now contains a larger population than the States of the Union held at the beginning of the 19th century. In 1800 4 per cent were town dwellers; the proportions in 1830 and 1860 were 6.7 and 16.1 respectively. In 1890 the population living in urban places of 2,500 or over was 36.1 of the whole; in 1900, 40.5, in 1910, 46.3. In New York, New Jersey, Pennsylvania, Maryland, Illinois, Ohio, Colorado, California, Washington, and in all New England States with the exception of Vermont, the urban population predominates; New York, Chicago and Philadelphia contain about an eighth of the entire population of the United States.

The census of 1910 showed that 96.7 per cent of the inhabitants of Rhode Island lived in communities of 2,500 and over, 92.8 in Massachusetts, 78.8 in New York and 69.7 in Connecticut. The percentages for the South Atlantic States were 25.4 (19.5 in 1900), for the West Central States 22.3 (15.1 in 1900), and for the East South Central 18.7 (12.7 in 1900). The ratio of increase for the last decade was highest in cities of from 50,000 to 250,000, being 42 per cent. The rate of increase for the entire urban population was 38.5 per cent, as against 11.1 for the rural. A disquieting feature in the last returns is the fall of the birthrate in rural districts.

In England and Wales in 1851, 50.08 per cent of the population lived in towns; in 1911 the percentage was 78 per cent. In 1816 but 2 per cent of the population in Germany resided in cities of over 100,000 inhabitants. In 1910, 54.3 per cent were living in communities of 2,000 or over; the number living in cities of over 100,000 increased by 50 per cent in the last decade. In 1870, 68 per cent of the people were engaged in agriculture; in 1907 only 28 per cent. In France, Belgium and Holland the proportion of town dwellers is about 40 per cent. In Australia about one-third of the population is urban. In the decade from 1900–11 the rural population of Canada fell from 63 to 55 per cent of the whole. Even in the Western provinces, where millions of acres of virgin soil were opened for cultivation, the urban population showed a much greater relative increase than did the rural, and came near to the rural in absolute numbers, while in every one of the Eastern provinces with the exception of Quebec, the country population showed a decline.

Much has been said and written upon the immorality of large cities, and it cannot be denied that they have vices peculiar to themselves; but it must be considered, on the other hand, that they are free from many of those of petty towns, and even of rural districts. The association of men in masses, when due surveillance is exercised, has an influence distinctly favorable to the maintenance of social order, the impartial administration of justice, and, above all, the suppression of all petty and local tyrannies, and the maintenance of individual liberties. It is by the influence of cities alone that a sufficient organization for the support of education and the means of enlightenment is obtained, even though that organization often fails to penetrate the entire mass of the cities themselves. It is to them that many of the facilities for progress in art and science are due. It is in them that public opinion is formed, and so organized as to act upon the administration, and, even independently of direct representation, upon the legislation of a country; and although the individual freedom enjoyed in great cities may often tend to license, its general influence in an otherwise healthy community is highly beneficial to the moral tone of the whole. It must, however, be admitted that the democratic spirit in cities is liable to be carried too far, that an excessive growth of large towns might thus prove dangerous to the state. See APPROPRIATIONS, AMERICAN SYSTEM OF; BUDGETS; CITY COUNCILS; CITY MANAGER PLAN OF GOVERNMENT; CITY PLANNING; CITIES, AMERICAN, GOVERNMENT OF; CITIES, EUROPEAN, GOVERNMENT OF; MUNICIPAL

GOVERNMENT; COMMISSION FORM OF GOVERNMENT.

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CITY APPROPRIATIONS. See APPROPRIATIONS, AMERICAN SYSTEM OF; BUDGETS, AMERICAN.

CITY OF BROTHERLY LOVE (Gr. *φιλαδελφία, philadelphia, φίλος, philos,* dear, and *ἀδελφός, adelphos,* brother). William Penn gave the English rendering of the two words as the name, Philadelphia, to a city in Pennsylvania. The common rendering into English of the name of the city is "City of Brotherly Love."

CITY BUDGETS. See BUDGETS, AMERICAN; APPROPRIATIONS, AMERICAN SYSTEM OF.

CITY OF CHURCHES, a name given to Brooklyn, N. Y., because of the large number of churches (556 in 1917) in proportion to the population, estimated 1 July 1916 at 1,928,432. The name was also given to Mexico City by Humboldt, where there were at the time 360 churches to 400,000 inhabitants.

CITY COUNCILS, American. Organization.— City councils in the United States are usually of the single-chamber type although many cities, including a few of the larger ones, have councils with the bicameral or double-chamber organization. In colonial times the single chamber prevailed in all the chartered boroughs, but after the Revolution the double-chamber was introduced, largely through the application to city government of the so-termed Federal analogy. Congress was bicameral, so were the State legislatures. Following their example the cities provided themselves with two local legislative bodies, commonly known as the board of aldermen and the common council, respectively. But in the course of time there came a reaction against the cumbrousness of this system and it was in many communities abandoned. Eventually it will disappear altogether. No American city which has changed from the double to the single-chamber plan has ever retraced its steps in this regard.

The Councillors.— The number of members in American city councils varies greatly. Some small communities have only seven or nine councillors; more commonly the number is 15 or 21; in a few of the largest cities it rises much higher. In Chicago it is 70; in New York the city's single legislative chamber (known as the board of aldermen) has 79 members; in Philadelphia the total membership of the two chambers is 132. But the drift has been everywhere in the direction of reduced membership. By charter amendments in recent years the number of councillors has been reduced in Boston to 9, in Saint Louis to 13 and Cleveland to 26.

Councillors are elected by popular vote; their term of service varies from one to four years in different cities; they are usually paid a stated salary per annum. As a general rule any voter is eligible to be a candidate for election; but in a few cities there are additional qualifications as to age or length of residence in the city.

There are three methods of electing members of city councils, namely, election by wards, election by the city at large and election by a combination of these two plans. In the smaller cities election at large is the usual method. In the larger cities the ward system of election is common. Both plans have their defects; the ward system too often results in the election of mediocre men, while under the scheme of election at large the entire slate of the dominant political party is frequently chosen and the minority party is left without representation entirely. The effort has been made to lessen these objections by a combination of the two plans, providing for the choice of some councillors by wards and others by the voters of the city as a whole.

The council elections are almost everywhere contested upon a partisan basis. From time to time non-partisan organizations put forward their candidates but rarely with continued success. Nominations are made by party conventions, or more commonly, by some form of primary, closed or open (see PRIMARY). The election is everywhere by secret ballot and ordinarily a plurality of the votes actually cast is sufficient to elect. In a few cities, however, the preferential form of ballot is used (see PREFERENTIAL VOTING). In most cities there are strict regulations for the prevention of fraud and corrupt practices at council elections and in some of them the maximum amount that may be spent by candidates, even for legitimate campaign expenses, is rigidly fixed by law.

City Council Procedure.— Each city council adopts its own rules of procedure, but these rules do not differ widely throughout the cities of the United States. Regular meetings of the council are provided for, these meetings being held once a week in the larger municipalities, once a fortnight or even once a month in the smaller. In a few cities the mayor presides at these meetings, but for the most part the council chooses from its own membership a chairman or president to serve for one year. Meetings are almost invariably open to the public; the council records are kept by the city clerk or by a clerk of the council, and in the larger cities these are usually issued in printed form. Each city council has its own order of business and its own standing rules as to how business shall be disposed of; but these rules may usually be suspended by a two-thirds vote.

Council Committees.—As city councils have a considerable variety of matters to deal with it is customary to maintain several standing committees. In large cities there may be 20 or more of these committees. Their selection is one of the first things to be done after a new council has been elected. In most cities the work of arranging the membership of these various committees is in the hands of the pre-

siding officer who makes his "slate" after consulting with the councillors and announces it when completed. In a few cases, however, the work is done by the council itself through the medium of a "committee on committees." Some one member of each committee is designated as chairman and presides at the committee's meetings.

In the usual course of events all business coming to the city council for consideration is first of all referred to the appropriate committee. The standing committees on such fields of local administration as streets, public health, water supply, police, fire protection, parks, finance and so forth, each receive the matters which seem to come within their respective jurisdictions. At meetings of the committees these things are considered; public hearings are held if the importance of the matters in hand so warrant and in due course the committee reports to the council its recommendation upon each item that has been referred to it. The council may or may not adopt these recommendations but the committee's reports usually carry considerable weight. On the other hand the recommendations of committees are set aside frequently and this practice has greatly impaired the efficiency of the work done by the councils. So much business comes before the council that the members as a whole cannot study every question thoroughly. This work, if it is to be done at all, must be performed by committees. But the frequency with which the results of a committee's investigation are cast aside by the whole council has led to many abuses and forms one of the chief reasons for the growing demand that councils be reduced in size so that committees may be abolished altogether.

Powers of the Council.— (a) *Legislative.* City councils are primarily legislative bodies; they frame and enact the local ordinances subject to the mayor's veto power where that power exists as it does in most cities. Through this ordinance-making power they exercise entire or partial jurisdiction over a great variety of matters of which only the most important can be described here. First of all come powers in the domain of local finance. The city council determines the local tax rate although it does not, as a rule, have any discretion as to the forms of property that may be taxed nor the type of tax that may be imposed. These things are regulated by State law. But the rate of annual taxes depends upon the amounts of money appropriated for municipal expenditures, and these appropriations must in all cases be passed by the council before they become available. The estimates of necessary appropriations for each year may be transmitted to the council by the mayor, as in Boston; in a few cities, notably in New York, they are prepared under the supervision of an administrative body known as the board of estimate and apportionment; in some cities, as for example, in Chicago, they are arranged by a committee of the city council itself. But, however prepared, the estimates must be submitted to the council to be finally acted upon. If the estimates are segregated, the council acts upon them item by item, appropriating a designated amount of money for each specific requirement. This is known as the segregated budget system of making municipal appropriations. If, on the other hand, the estimates are submitted in terms of total requirements for each municipal department, the system is known as lump-sum budget plan. See BUDGETS, AMERICAN.

In dealing with appropriations, however, the city council does not, in most cases, possess entire discretion. The State laws require some appropriations to be made. The provisions of city charters sometimes provide, as in New York and Boston, that no changes by way of increase may be made by the council in the estimates for appropriations submitted to it.

Borrowing on the city's credit is another matter over which the council has a measure of control. The initiative does not usually rest with the council but its assent is in all cases necessary before bonds can be issued. Here again, however, State constitutions and statutes have by the imposition of municipal debt limits restricted the liberty of the local authorities.

A second branch of the city council's legislative jurisdiction lies in what is commonly known as the domain of the police power. Speaking broadly the council has the right, within the generous limits permitted by State laws, to enact ordinances designed to protect the lives, property, health and morals of the citizens. Within this category come ordinances regulating traffic in the streets, establishing rules for the prevention of fires, setting standards for building construction, providing sanitary regulations, rules governing the inspection of milk, the conduct of theatres and open places of amusement, the erection and maintenance of billboards and a great variety of other matters. It is true that in some cities the right to regulate some of these things has been taken from the council and given to the board of health or the police commission or to some other administrative board, but taking the cities of the country as a whole the council still possesses a wide range of jurisdiction.

In the third place the city council usually has powers with respect to the granting of franchises to public service corporations which seek to acquire rights in the public streets. But in this field great inroads upon the council's freedom of action have been made by the State in recent years. Most of the States have established public service commissions or public utilities boards and to these bodies much authority with reference to the terms of franchises has been entrusted. The power of city councils to grant and determine franchises at will is a thing of the past. The assent of some State authority or the approval of its action by a referendum to the voters is now a requirement in most cities. Nevertheless the council retains some powers in this field and they are of not inconsiderable importance.

And where a city itself owns and operates any public service such as the water supply or the lighting plant, the council has ordinarily the power to regulate by ordinance the terms and incidents of the service. The immediate management is not commonly in the council's hands, but the direction of general policy is controlled by it in most cases.

All these things and many others are determined by the provisions of ordinances which the council has power to enact. In addition to the specific limitations imposed by State law, however, there are certain general restrictions which apply to all ordinances. Ordinances to be valid must be reasonable; they must not

make unfair discriminations, and they must not be unwarrantably in restraint of trade. Whatever the council's powers they must be exercised within the limits set by their general rules.

(b) *Administrative powers.* City councils are not administrative bodies, and strictly speaking they should possess no administrative functions. Nevertheless they do in most cities possess powers of this sort and in some of them powers of importance. Some administrative appointments are still made by city councils; the city clerk, for example, is frequently so selected. In various cities the council's concurrence is necessary before appointments made by the mayor become valid. Its consent, moreover, is sometimes required for the award of contracts, for the acquisition of land when needed for parks or public buildings, and for changes in the organization of city departments or in the salaries of municipal officials. Usually it may investigate any branch of the city administration. And even in the absence of actual jurisdiction over administrative matters the council's control of the city's purse-strings necessarily gives it at least a substantial influence in this field.

Conclusion.— American city councils have been shorn of many powers but they still retain others of high importance. The tendency during the last half century has been to strengthen the executive branch of municipal government at the expense of the city legislature. In different cities this tendency has had varying degrees of strength; accordingly in no two cities of the land have city councils exactly the same jurisdiction. In some they retain much more than in others. See CITIES, AMERICAN, GOVERNMENT OF; COMMISSION FORM OF GOVERNMENT; MUNICIPAL GOVERNMENT.

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WILLIAM BENNETT MUNRO,
Professor of Municipal Government, Harvard University.

CITY OF DAVID, Bethlehem (modern Beit-Lahm, house of bread), supposed to be the birthplace of David, the place where his descendants had to go for the enrolment, when the census was taken by order of the Roman emperor. Jerusalem is sometimes called the "City of David" because he captured it from the Jebusites and made it the capital of his kingdom.

CITY OF DESTRUCTION, The. In Bunyan's 'Pilgrim's Progress' Christian begins his journey at this city and journeys to the Celestial city. The place of beginning represents the world with its temptations, and the place of ending, Heaven with its joys.

CITY DISTRICTS. See DISTRICT.

CITY OF DREADFUL NIGHT, The. This well-known poem by James Thomson was first published in *The National Reformer* in 1874, under the initials "B. V." for Bysshe Vanolis, Thomson's *nom-de-plume.* The work is the most remarkable example in English literature of the unrestrained expression of intense and overpowering gloom. It has appropriately been called a "litany of pessimism." The author writes

"Because a cold rage seizes one at whiles
To show the bitter, old and wrinkled truth,
Stripped naked of all vesture that beguiles,
False dreams, false hopes, false masks and modes of youth."

His words are addressed not to the happy, not to "those pious spirits with a God above them," not to optimists who look for a heaven upon earth, but to desolate and Fate-smitten sufferers like himself who see no ray of hope. 'The City' is life,— sombre, desolate, a hell on earth. It is empty, save for wretches who move to and fro in the gloom like spectres, speaking as with one voice the message of despondency and woe. In a succession of vague incidents, which give forward movement to the meditation, the poet encounters one after another of these shadowy figures. He hears a sort of atheistical sermon preached from the dark pulpit of a cathedral to a vast congregation of "spectral wanderers of unholy night," counseling despair and suicide. The poem closes with a memorable description of Dürer's 'Melancholia,' whom Thomson makes the presiding goddess of his doleful city.

False as the note of unrelieved pessimism may sound to healthy ears, there is in Thomson's poem an unescapable appeal, due partly to the author's compelling power of imagination, partly to his mastery of the cadences of verse and partly to the very intensity of his mood. The atmosphere of gloomy mystery and the deep intonations of language in 'The City' are said to owe something to the poetry of Poe; its melancholy is "compounded of many simples." Yet Thomson's poem remains not only highly original but unique. Thomson's poems were published in collected form by Reeves and Turner in 1880; for comment consult Walker, 'The Literature of the Victorian Era,' and Stedman, 'Victorian Poets.'

JAMES H. HANFORD.

CITY OF GOD, The, a noted work by Saint Augustine. This, the most important of all the saint's writings, was begun in 413, three years after the capture and pillage of Rome by the Visigoths under Alaric. The pagans had endeavored to show that this calamity was the natural consequence of the spread of the Christian religion, and the main purpose of Augustine is to refute them. The work was finished about 426. See DE CIVITATE DEI.

CITY OF A HUNDRED TOWERS, a name given to Pavia, Italy, from the many towers and steeples which first greet the traveler.

CITY OF MAGNIFICENT DISTANCES, The, a name given to Washington, D. C. When the city was planned, the last of the 18th century, the long and broad streets, with here and there small parks, almost all of which were out long distances in broad fields, caused this name to be given to it in derision. Now its citizens are proud of the title.

CITY MANAGER PLAN OF GOVERNMENT. As outlined in the charter of Dayton, Ohio, the commission or city manager plan of municipal government "shall consist of a commission of five citizens, who shall be elected at large, . . . shall constitute the governing body with power as hereinafter provided to pass ordinances, adopt regulations, and appoint a chief

administrative officer to be known as the 'City Manager' . . . who shall be administrative head of the municipal government and shall be responsible for the efficient administration of all departments. He shall be appointed without regard to his political beliefs and may or may not be a resident of the city of Dayton when appointed. He shall hold office at the will of the commission and shall be subject to recall as herein provided. The powers and duties of the city manager shall be: (a) To see that the laws and ordinances are enforced; (b) to appoint and, except as herein provided, remove all directors of departments and all subordinate officers and employees in the departments in both the classified and unclassified service; all appointments to be upon merit and fitness alone, and in the classified service all appointments and removals to be subject to the civil service provisions of this charter; (c) to exercise control over all departments and divisions created . . . by the commission; (d) to attend all meetings of the commission with the right to take part in the discussion but having no vote; (e) to recommend to the commission for adoption such measures as he may deem necessary or expedient; (f) to keep the commission fully advised as to the financial condition and needs of the city; and (g) to perform such other duties as may be prescribed by this charter or be required of him by ordinance or resolution of the commission. . . . The city manager may without notice cause the affairs of any department or the conduct of any officer or employee to be examined. Any person or persons appointed by the city manager [for this purpose] shall have the same power to compel the attendance of witnesses and the production of books and papers and other evidence, and to cause witnesses to be punished for contempt, as is conferred upon the commission by this charter."

Such in brief are the powers and duties of the city manager, the minor details differing only slightly in the various cities operating under such government. Under commission government one responsible body supersedes the two formerly in vogue; the number of elective officers is reduced; the responsibility for the administration of the various city services is fixed; and certain checks in the way of public control are provided. But in two respects the original plan of commission government fails to meet all requirements. In the first place the elective officers are called upon to execute what only the professionally experienced are competent to perform; and in the second place commission government fails to co-ordinate the work of administration by subordinating it to one central responsible authority. These defects are remedied by the city manager plan, since the manager is chosen because of expert qualifications and in turn appoints his subordinates on the basis of the same qualifications. Being appointed and subject to removal by him, under proper limitations, the department heads are responsible to him in every particular and hence he can use that compulsion which is frequently necessary to secure successful co-operation. On the other hand, none of the legal and political characteristics of commission government are interfered with or altered by the city manager — the commission retains its legislative function, its advisory capacity and its power to formulate broad-minded policies and wise plans, the execution being left to the expert. Toulmin says: "The unspoken qualifications, undoubtedly the chiefest in the make-up of a man in such a position are, first, absolute, unswerving adherence to his own view that efficiency, and hence results for the city, is the paramount thing; second, administrative experience in business involving the maintenance of engineering works and the necessary technical education; and third, the ability to lead through tact as well as knowledge." When the commission selects the city manager, it has power to fix his salary and to secure the best man the city finances will justify. Sometimes the salary of a city manager seems large but it is justified if the recipient save the city the excess and more by his economy of administration without impairment of results.

The advantages claimed for the city manager plan are: (1) It creates a single-headed administrative establishment instead of several separate administrative establishments; (2) it permits expertness in administration at the head, where it is most needed; (3) it permits comparative permanence in office of the chief executive, whereas the terms of elective executives are rarely long, this permanence tending to eliminate amateur and transient executives and enabling the consummation of far-sighted policies extending over many years; (4) it permits the city manager to migrate from city to city, and thus as he need not be a resident of the city at the time of his appointment, an experienced man may be summoned at increased salary from a similar post in another city; (5) while giving a single-headed administration, it abolishes the one-man power of the old mayor-and-council plan, and, as the manager is subject to instant correction or even discharge by the commission, the city need not suffer from his personal whims or prejudices, whereas, on the other hand, the combined judgment of the whole commission safely submerges and averages the individual whims or prejudices of the various members of the commission, etc.

In 1908 the city of Staunton, Va., initiated the city manager plan in the United States by adopting an ordinance providing for a "general manager" who should assume all executive duties save those reserved to the finance, ordinance, school and auditing committees and be responsible to the elected governing body of the city; the mayor and council were retained because under the Virginia constitution the city could not change its government to the commission form. Hence the innovation created no widespread interest, but in 1912 the city of Sumter, S. C., directed attention to the plan by adopting a commission form of government and advertising widely throughout the country for applicants for the position of city manager. In 1911 the Board of Trade of Lockport, N. Y., secured the introduction in the New York legislature of a bill authorizing commission government with a city manager for cities of the third class in that State, but the bill failed to pass. Nevertheless the interest manifested in the city manager plan has resulted in its adoption in many cities in the United States and also the passage of general State-wide laws by Massachusetts, New York, Virginia, Ohio and Iowa, permitting all or certain classes of cities to adopt the plan. A list follows of the

number of cities operating wholly or in part under the city manager plan, and of some of the more important of these cities with the year in which the plan became effective.

ARKANSAS, 2.— Bentonville, 1915; Hot Springs, 1917.
ARIZONA, 3.— Phoenix, 1914; Tucson, 1915.
CALIFORNIA, 10.— Bakersfield, 1915; San Diego, 1915; San José, 1916; Santa Barbara, 1918.
COLORADO, 2.— Durango, 1915.
CONNECTICUT, 1.— Farmington.
FLORIDA, 3.— St. Augustine, 1915; St. Petersburg, 1916.
GEORGIA, 1.— Griffin, 1918.
ILLINOIS, 2.— Winnetka, 1915.
INDIANA, 1.— Cambridge City.
IOWA, 11.— Grinnell, 1916; Webster City, 1915.
KANSAS, 4.— Eldorado, 1917; Wichita, 1917.
KENTUCKY, 1.— Cynthiana, 1915.
MAINE, 1.— Auburn.
MASSACHUSETTS, 2.— Waltham, 1917.
MICHIGAN, 15.— Alpena, 1916; Grand Rapids, 1917; Sault Sainte Marie, 1917; Jackson, 1915.
MINNESOTA, 3.— Morris, 1914.
MONTANA, 1.— Glasgow, 1916.
NEW MEXICO, 2.— Albuquerque, 1917.
NEW YORK, 5.— Newburgh, 1916; Niagara Falls, 1916; Watertown, 1918.
NORTH CAROLINA.— Durham; High Point, 1915; Morgantown, 1913.
NORTH DAKOTA, 1.— Carrington.
OHIO, 10.— Dayton, 1914; Sandusky, 1916; Zanesville, 1918.
OKLAHOMA, 3.— Mongum.
OREGON, 1.— La Grande, 1913.
PENNSYLVANIA, 5.— Altoona, 1918; Titusville, 1913.
SOUTH CAROLINA, 3.— Sumter, 1912.
SOUTH DAKOTA, 2.— Clark, 1912.
TENNESSEE, 3.— Jackson.
TEXAS, 13.— Brownsville, 1916; San Angelo, 1916; Sherman, 1915; Tyler, 1915.
VIRGINIA, 10.— Norfolk, 1917; Portsmouth, 1916.
WASHINGTON, 1.— Snohomish, 1915.
WEST VIRGINIA, 4.— Charleston, 1915; Wheeling, 1917.
WISCONSIN, 1.— Horicon, 1914.

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CITY OF OAKS, a name given to Raleigh, N. C., from the size and beauty of some of the oak trees which adorn its streets.

CITY OF PALACES, a name applied to Calcutta, India, from the numerous palace-like edifices.

CITY OF THE PLAGUE, The, the name of a poem written by John Wilson (Christopher North), published in 1816. It is said to have been founded on the 'Journal of the Plague in London,' by Defoe.

CITY PLANNING. Due to the congestion of certain portions of cities, and their piecemeal development, without regard to order, with slums and inaccessible suburbs, greater attention is now being paid to the development of the science of city planning, for the purpose of balancing the different elements which constitute a municipality, and to give a greater degree of comfort and pleasure to its inhabitants. City planning is not alone a matter of engineering and architecture, but vitally concerned with the social, ethical and physical condition of the citizens. It means more light, purer air and more healthful and less expensive living quarters. City planning provides safer and more direct means of transportation, prevents traffic accidents and saves time. Conveniently located parks, places for recreation, public baths and gymnasiums, with access to woodlands and athletic fields, gives greater opportunity for physical development. The proper location of municipal markets affords cheap and wholesome supplies of food. These factors, together with the convenient location of schools, libraries, churches and other structures of a public nature, all unite to elevate the life of the citizens. A greater sense of civic responsibility is instilled in the citizens, their comfort and means of enjoyment are increased and the morale of the entire community is raised. While the movement, as we know it, is recent, the art of city planning is of the greatest antiquity. The remains of the earliest communal abodes of man, however primitive, show a certain definite arrangement. With the development of races, villages became towns, and towns, cities, continually on a larger scale; and it is undoubtedly true that the higher the degree of civilization of a people, the greater will be the size of its cities. The civilization of the Romans was largely expressed in the grandeur of the city of Rome, and the glories of ancient peoples were generally shown in their cities.

In the art of city planning, genius has occasionally arisen — among the early masters being Merian and Canaletto, the former developing the general plan of the city, while the latter excelled in the planning of its internal arrangements. Sir Christopher Wren, in 1666, after the great fire of London had the genius to present a plan for the reconstruction of the city that would have made it the most beautiful in the world, but he was ahead of his time, and London was permitted to grow up into the disordered mass of streets and lanes that makes it such a puzzle to the stranger. L'Enfant,

however, who planned the city of Washington, D. C., admittedly the most beautiful city in America and one of the most beautiful in the world, enjoyed the double good fortune of having the support of the founders of the republic and an unencumbered site upon which to build. Most city planners have had to reorganize existing cities. Equally fortunate was Baron Haussmann, who rebuilt Paris. He was given a free hand, and a plan was developed in which conceptions of order, convenience, variety and grandeur were not subjected to interference by questions of expense. Great avenues were cut through labyrinths of streets, and foul and congested districts were replaced by parks and spacious squares. The plan of the city of Buffalo is notable among American cities. Joseph Ellicott, an agent of the Holland Land Company, laid out the city in 1801–02. He is known as the "Father of Buffalo," and the city owes him a debt of gratitude for a well-conceived and well-executed plan, the fruit of his genius and foresight. Joseph Ellicott was a younger brother of Andrew Ellicott, the first surveyor-general of the United States, who completed the city of Washington on the designs of the great French planner, L'Enfant. After him the art of city planning in America seems to have died, for, with the exception of Washington and Buffalo, American cities have been almost wholly built at haphazard.

The early masters, however, did not impart their theory, leaving instead only their accomplished work as examples. Modern or practical city planning is, therefore, a new art, of German origin, based upon principles, theories and practice reduced to a scientific basis. The originators and modern masters are Reinhard Baumeister, the originator of the science of city planning, and Camille Sitte, the creator of the æsthetic principles governing the same, while, of practical city builders, Joseph Stübben is the greatest.

The results obtained by German city planners in applying scientific methods in the development of their cities have been studied by officials of other countries, with the consequence that within the past decade numerous cities in France, England, United States, Canada and Australia have organized city planning commissions, whose plan is to co-operate with the city authorities. In many States of the Union laws are in force to this effect; for instance, all third class cities (above 50,000 population) in the State of Pennsylvania must have city planning commissions, must retain a city planning expert and provide ways and means for the betterment and enlargement of their cities. The jurisdiction of these commissions covers also the territory within three miles of the city limit. Already more than 200 cities of the United States have adopted more or less comprehensive systems of city planning, and the number is constantly increasing.

Principles of City Planning.— The German city building movement produced great, practical city planners, who have left no municipal factor out of their calculations, and as a result the United Society of German Architects and Engineers in 1874 formulated a set of fundamental principles governing their activities. Some of the basic principles of enlarging a city, considered from the technical, the economic and the administrative points of view, are: "(1) The scope of city planning consists principally in fixing the base lines of all traffic movements and transit facilities, viz.: Streets, street cars, railroads and canals, which must be treated liberally and systematically. (2) The street net should contain the main streets, with the existing streets taken duly into consideration; the auxiliary streets which are fixed by local conditions; and in addition other subordinate streets, treated in accordance with the necessities of the immediate future, or having their development placed in the hands of interested property owners. (3) The grouping of the parts of the city should be effected in accordance with their location and individual characteristics, subject to such modification as may be demanded by sanitary considerations and the exigencies of commerce and industry. (4) The duty of the building department is to determine the rights and privileges of tenant and neighbor and house owner. Such rights and privileges are related to fire protection, freedom from interference, health, and safety of buildings; and all æsthetic considerations must be secondary thereto. (5) It is desirable that expropriation and impropriation be facilitated by legal measures, and of still more importance is the creation of a law providing for the regulation of new or reconstructed blocks to be built upon. (6) The city should be reimbursed by property holders directly benefited by improvements by funds advanced by the city for such purposes, and it is advisable to have the amount stipulated before the work is begun and a normal cost per front foot fixed. (7) The activities of interested property owners' associations, in regard to the improvement of certain sections, should be subject to municipal supervision. (8) Land upon which it is imperative to make improvements should only be built upon under reservations for its subsequent use by the city. The property owner whose land has been marked out for street improvements should be entitled to demand expropriation with compensation, in the event of delay in making the improvements. The installation of sewer connections to new buildings must be at the expense of the property holder, but the city should be obligated to install a complete system upon the guarantee of a sufficient number of property owners of abutting property."

In his work 'Stadterweiterungen in technischer, baupolizeilicher und wirtschaftlicher Beziehung' (1876), Baumeister says: "In the city of the future, there will be three principal divisions: a business section as a core, an industrial district, including possibly a wholesale and a residential district. It is, therefore, important that all large cities of the future, from the outset, should keep these principles in view. It must be recognized that the development of a city is confined to these three divisions and that they are interdependent in their development, though for the necessities of an immediate future, piecemeal progress may be made with subordinate projects. To each basic division belong main streets, railroads and drainage canals, together with the grouping of industrial districts and the selection of places for public buildings and promenades. The immediate object is not to complete the planning at once, but to gain control of the ground that will be needed. In a good street net, dis-

tinction must be made between the main streets and the auxiliary streets. There must not only be variety in the city as a whole, but also in its various districts. Symmetry in grouping of buildings, picturesque perspective of streets and plazas, well chosen points of observation, and attractive successions of buildings constitute the individual elements of a satisfactory architectural impression. The straight stretches of the arterial highways of the city should be gradually transformed, as the suburbs are reached, into forms more characteristic of rural life, with curves and deflections. While additional time will be consumed in traversing such streets, the life of the city has been left behind, and the enjoyments of the country have been reached. The further such avenues extend the more rural in character should they become."

The Civic Centre.— The heart of the city's design is the civic centre. It gives to the city its vital individuality, and imparts a sense of unity and cohesion that cannot be secured in any other manner. A city with a suitable civic centre no longer gives the impression of being an accidental conglomeration of buildings; it becomes an organized whole and gains a new dignity and a new meaning. These centres, as a rule, are located in the heart of the city and have ready access from all parts of the city and surrounding suburban districts. Several main arteries of traffic radiate from the civic centre, making it also the centre of the city's street plan, the keystone in the arch of its design. Such a centre can hardly be too great in area, and, however expensive this may prove as an initial outlay, it will be of the greatest ultimate benefit. To make it easily accessible to all parts of the city, new avenues and streets have been cut through to afford the proper approach.

The buildings to be included within the civic centre are the city hall, courthouse, hall of records, post-office and Federal court, customhouse, administrative buildings for the various departments, and certain buildings of a commercial character, either in the civic centre or adjacent thereto and contributing to its general effect, such as a chamber of commerce, banks and life insurance buildings. The leading principle of the design is that one of the buildings dominates the rest. This one is usually the city hall or courthouse. The other buildings are in character and style related to the dominant building, but not of such size or outline as to detract from its importance, as it should be, in an artistic sense, protective of the others. Another important principle of the civic centre is balance, the buildings being so proportioned and placed with reference to each other that their masses and outlines produce a pleasing effect. The design of a civic centre is an artistic problem of great magnitude. It is a painting, with the city and the sky as a background, a sculpture in masses, and it should have strength, feeling, completeness, balance and splendor. The art of the civic architect is one in which the greatest talent may find opportunity for expression not attainable in any other art. Probably the best example in the world of a civic centre is to be found in Washington. Originally built after the plans of L'Enfant, improvements have been continually added, in particular, in accordance with the report of the Senate (1902) regarding the construction of public buildings. Philadelphia, Seattle and Chicago, as well as many other progressive American cities, have planned and built civic centres on the most approved plan.

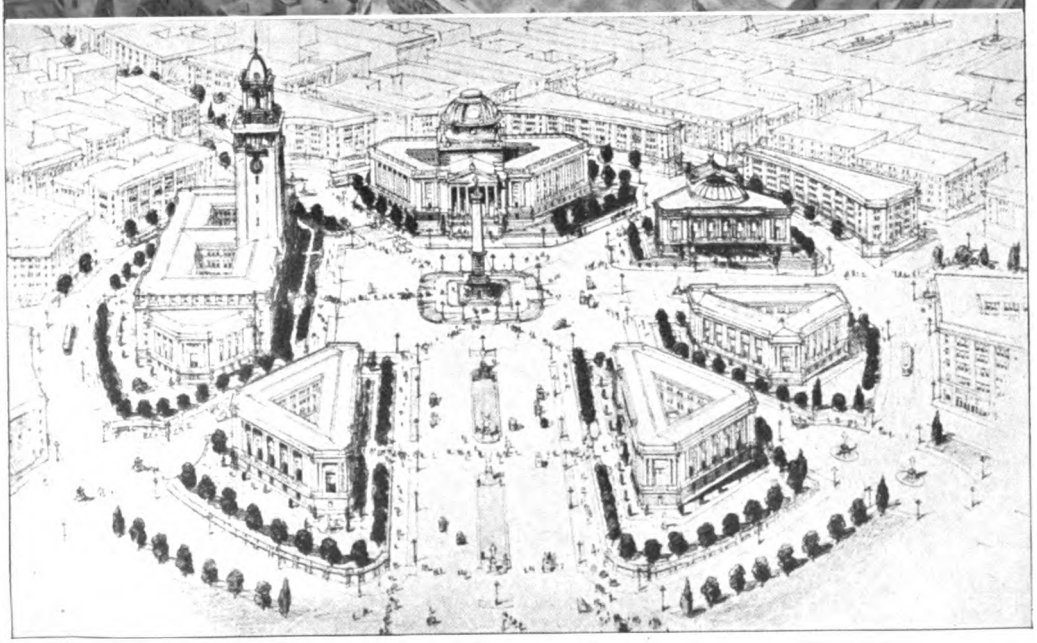
Main Streets.— The proper expansion of a city depends upon the arrangements of the main streets conforming to the topography, what is known as the great ground plan. Most American cities have rectangular block systems, with long straight streets. Few have diagonal and circumferential streets, often found in European cities. Very excellent examples of great ground plans are those of the cities, Karlsruhe and Mannheim, Germany. The principles given in this system of streets have been adopted in many European and American cities. For instance, the horseshoe effect, according to the plan of Mannheim, has been adopted in the remodeling of Chicago and Saint Louis, while the radiating street system of Karlsruhe is being followed in the new capital city of India, New Delhi. This radiating street plan is also to be found in Washington, D. C., and Buffalo, N. Y.

The area occupied by streets varies, ordinarily from 30 to 40 per cent of the total area of the city. The streets of Washington, which are unusually wide and imposing, occupy 54 per cent of the city's total area. By the Prussian law of 1875, enacted to regulate the streets of Berlin, it was prescribed that the main streets should be 95 feet or more in width; secondary thoroughfares from 65 to 95 feet; and local streets from 40 to 65 feet. Another standard, for secondary German cities, such as Düsseldorf, Cologne, Frankfort, etc., is: Main thoroughfares, 85 to 120 feet; secondary thoroughfares, 50 to 80 feet; and local streets, 35 to 48 feet.

In London, the Royal Commission on London Traffic, in its report of 1905, stated: "The chief difficulty that stands in the way of improving the means of locomotion in London is the narrowness of the streets, and the fact that they were not originally laid out on any general plan." In accordance therewith it was recommended that the following be observed: Main avenues, 140 feet; first class arterial streets, 100 feet; second class arterial streets, 80 feet; third class 60 feet, and fourth class 40 to 50 feet, the width in each case to include the footways on either side, and no street to be less than 40 feet.

The widths of the more prominent avenues in European cities are as follows: Avenue des Champs-Elysées, Paris, 250 feet; Reeperbahn, Hamburg, 210; Unter den Linden, Berlin, 190; Ring-Strasse, Vienna, 185; Belle-Alliance Strasse, Berlin, 160; Andrassy, Budapest, 145; Avenue Henri Martin, Paris, 130; Whitehall, London, 120–145; Victoria Embankment, London, 120; Potsdamer and Friedrich Wilhelm Strasse, Berlin, 110; Princess and George Streets, Edinburgh, 100; Avenue de l'Opéra and Paris Boulevards, Paris, 98; Holborn Viaduct, London, 90; Regent Street Quadrant, London, 85; Picadilly, London, 75; and Queen Victoria Street, London, 70.

One of the main objects in modern city planning is to secure streets of definite length, properly terminated, or curved or otherwise changed as to direction, avoiding the principle of having them of the same width throughout.



1 Approach to Williamsburg Bridge, New York City
2 Civic Center Project for the City of Seattle

The eye should rest at easy distances upon columns, arches, statues, fountains, façades or other suitable objectives, and the quality of unity will thus be gained. Without a terminal, a vista is meaningless. What, for example, would the Avenue de l'Opéra be without the closure of the Grand Opera House; Rue Royale, without the Madeleine; Avenue Victoria, without the Hotel de Ville; the Vienna Burgring, without the Parliament building; Reichsratstrasse, without the Votiv Kirche; and Unter den Linden, without the Brandenburg Tor?

In undertakings of breaking new streets, foreign cities have not hesitated at expense. Paris it is estimated has spent $265,000,000 on its reconstruction. London in new streets has spent $100,000,000, and the new commission has under way expenditures that will increase this by $125,000,000. That expenditures for the betterment of traffic conditions are justified is shown by a calculation made with reference to the improvement in a portion of Saint Louis, the cutting through of Gravois avenue to 13th street, a short stretch of three blocks. It is estimated that the saving in time to those using the cut-off would amount to $500,000 in a year. The calculation is on the following basis: The saving would amount to 10 minutes per day for every person traveling over the road. In a year this would amount to 100 hours per person, which at 20 cents per hour means a saving of $20 per year, or for a traffic of 25,000 persons daily — one-twenty-eighth of the city's population — the aggregate of $500,000 per annum.

Civic Embellishment.— Unless the streets of a city are properly embellished, kept free from nuisances, and given proper attention in every detail, the city will fail of realizing its full advantages, however well it may be planned. Such embellishments comprise, among other features, boulevards, esplanades, bridge and park approaches, water gates, quays, plazas, squares, bay fronts, terraces, monuments, statuary, fountains, trees, grass plots, artistically designed electroliers, trolley poles and other like structures and details. The combination of such features makes up the impression produced by the streets, and just at this point carelessness, neglect or inadequacy in the treatment of small structures or other objects is likely to destroy the whole effect and spoil what has been accomplished at the cost of much time, skill, labor and expense.

Of the more important features of civil embellishment are the boulevards, esplanades and plazas, with the liberal provision of grass plots, shrubbery and trees on the streets. Among the trees that are useful for city purposes are the following: Norway Maple, Sugar Maple, Scotch and American Elms, Cottonwood, Horse Chestnut, Red, White and Pine Oaks, Ash, Catalpa, Linden, Kentucky Coffee Tree, Thornless Honey Locust, Lombardy Poplar, Evergreen Pines and Cedar.

Trolley poles in cities using the overhead system, lighting poles, as well as the lighting system itself, if properly designed, may be made highly ornamental features of street equipment.

The appearance of a city and the impression that visitors, as well as residents, receive, is dependent far more than is generally supposed upon the appearance of the sidewalks, considered apart from their adjacent buildings. Sidewalk regulations have been in force abroad for many years, and within the past five years various American cities have adopted similar plans. As an example, the city of New York has recently added to its sidewalk regulations by prescribing that the widening of the roadway shall be at the expense of the sidewalks, and the latter to regain their width by the removal of building encroachments, such as stoops, areaways, pillars, porticos and the like. Although bitterly opposed for a number of years, and though the removal of such encroachments has marred the lower sections of some of the buildings that had for years trespassed on the street, the plans of the city have been carried out, and the process is constantly being extended on all streets where traffic is congested.

A matter of the most pressing importance is that of the municipal public comfort station, a subject that has been greatly neglected. Without an adequate system, the health of the public is seriously affected, and numberless are the instances cited by physicians where their absence has been the cause of numerous diseases and ailments. Two methods are followed in the architectural treatment of the comfort station, one being to place them underground, with entrances as inconspicuous as possible, and the other is to make of them small monumental structures. English cities are well provided, Liverpool maintaining about 40 and Glasgow an equal number. Berlin maintains 450 such stations, or about one to every 10,000 of population, which for a large city is a sufficient number. Most of the English stations are underground, and in the United States the same system is largely followed, with the mistake, however, of too often having the entrances for men and women in too close proximity.

When the city has fulfilled its whole duty in the embellishment of its streets, avenues, promenades, boulevards and parks, it is still necessary for the individual citizen to complete the work by the erection of suitable and artistic buildings and residences. The work of the city is, at best, only a small share of what goes to make up the effect of the street which depends finally upon the character of the structures that fill it. For the encouragement of private owners, foreign cities often offer rewards for the most artistic façades. When a new street is opened, the prizes are announced, and when the street is built up, the awards are made. The prizes are usually large, for example, in Brussels $4,000, $2,500 and $1,500 have been awarded as prizes for the first, second and third best façades. In Paris, they have been awarded by way of remission of one-half of the street tax, and medals, and the result has been that there is keen and lively competition among house owners and architects.

Building Regulation.— In German cities the height of buildings is subject to very strict regulations. In Berlin, the height permitted is from 18 to 24 metres, or from 59 to 79 feet. The minimum height to which buildings are limited varies in different cities. In Wiesbaden, Bremen and Barmen it is 15 metres (49 feet); in Munich 12 metres (39⅓ feet); and in Kiel and Cologne, 11 metres (36 feet), this

being the minimum on the narrowest streets. It is greater, however, in the wider streets. Not only is the height of buildings regulated in German cities, but also the maximum and minimum number of stories, which depends on the zone in which the building is situated. In Berlin and Hamburg, the greater number of buildings must be either four or five stories in height. Throughout the grand duchy of Baden, the number of stories runs from three to five, in the suburbs and outlying districts, three being the maximum, and in the business districts the maximum being five. In Munich, Cologne, Düsseldorf, Halle and Breslau, all buildings must be at least two stories in height, but in Bremen, one-story buildings may be erected. In Baden, houses in the country are not permitted to be over two stories in height.

Many American cities have taken up the question of the regulation of the maximum height of buildings, and the following are excerpts from several of their regulations: Baltimore, Md.: No building more than 175 feet, except that towers, spires or belfries in fireproof buildings may extend to a greater height. Boston, Mass.: No ordinance, but building regulations provide the following: City divided into districts. District A, buildings of fireproof construction may be erected to a height of 125 feet; in another district, to a height of 100 feet; in a third, to 80 feet; but the buildings in these latter districts are not of the same construction as in District A. Buffalo, N. Y.: "Outside the fire limits of the city of Buffalo, it shall be lawful to erect frame buildings not exceeding 50 feet in height from the sidewalk to the highest point of roof." Cleveland, Ohio: "No building or other structure hereafter erected except a church spire, shot tower, water tower or smokestack, shall be of a height exceeding 2½ times the width of the widest street upon which the building faces, but no building shall be over 200 feet high." Denver, Colo.: "No building or structure to exceed 12 stories except spires, towers, smokestacks, etc. All buildings or structures more than 125 feet high to be absolutely fireproof." Los Angeles, Cal.: Fire district, one story only, and not over 16 feet high. Class A. All buildings upheld by masonry or reinforced concrete or framework of steel or iron. Fireproof or skeleton construction. No building over 150 feet high, allowing 30 feet for mansard roof — not more than seven stories. Class B. Masonry or masonry and steel, and iron and steel buildings, supporting iron or steel masonry. No over 100 feet high, nor more than eight stories. Class C. Masonry or reinforced concrete walls, floors not wholly carried by steel columns and girders or reinforced concrete and masonry — 85 feet high, not more than six stories, exclusive of basements. Class D. All buildings not included in A, B and C, not more than 50 feet high, nor more than four stories." Louisville, Ky.: "No nonfireproof building or structure outside the fire limits shall exceed 70 feet in height, but this shall not apply to spires of churches or similar buildings outside of the fire limits which may be constructed of wood to a height of 125 above the curb level." Portland, Ore.: "Class I (Absolutely fireproof), 12 stories, or 160 feet. Class II (Fireproof, short span), 12 stories, or 160 feet. Class III (Fireproof, long span), 10 stories, or 140 feet. Class IV (Semi-fireproof), 6 stories, or 85 feet. Class V (Mill construction), 6 stories, or 85 feet. Class VI (Ordinary construction), 4 stories, or 60 feet. Class VII (Frame construction), 3 stories, or 42 feet." Providence, R. I.: No ordinance. Building regulations provide: "No nonfireproof building or structure hereafter should exceed 65 feet in height. No fireproof building (ordinary) or structure hereafter erected shall exceed 120 feet in height, except that structures or appendages may be built upon roofs of said buildings not exceeding 20 feet in height, provided that said structure or appendage shall be built of incombustible material throughout. Every building hereafter erected or altered to be used as a theatre or public station which exceeds 3 stories or more than 40 feet in height, shall be built fireproof (absolute) except as hereinafter specified." Rochester, N. Y.: No ordinance. Height regulated to conform to size and strength of foundations and construction of walls. San Francisco, Cal.: Fireproof buildings, 102 feet; semi-fireproof buildings, from 55 to 86 feet.

The regulation of the height of buildings is only one of the numerous rules made and enforced abroad. Among the important ones are those affecting the ratio of the area of the building to that of the lot, the separation of buildings, classes of buildings, classes of areas between buildings, minimum number of rooms in an apartment, window area, height of ceilings and cubic air content of sleeping-rooms. Representative figures are selected, which, though in many cases not applicable to American cities, will give a good idea of the regulations. The area of the lot which may be built over in cities in the grand duchy of Baden, the regulations of which are regarded as being well worked out, varies according to the zone, from three-quarters to four-fifths of the total area. In the outlying districts, these figures are reversed, it being permissible to build only over one-quarter to one-fifth of the total area of the lot. In other cities the regulations vary, but are about on the same basis, a difference being made according to the zone.

The regulations abroad as regards the classes of buildings that may be used as workingmen's homes require the apartment used by the family to consist of not less than three rooms — a living-room, a sleeping-room and a kitchen. The living-room is required to be of a certain size. In Wiesbaden, this is 75 square feet; throughout Baden, 107 square feet; in Karlsruhe, 130 square feet; in Mannheim, 160 square feet, at the minimum. In the last named city, the kitchen must not be less than 130 square feet in area. There are in addition requirements as to the total area of the rooms, which in Düsseldorf, Magdeburg and throughout Saxony must not be less than 320 square feet. The height of the rooms is generally placed at not less than two and a half metres, or 8.2 feet, while the window area must be from one-twelfth to one-sixth of the area of the floor, an average being one-tenth. The minimum cubic air content of the rooms is also fixed by regulation at from 250 to 700 cubic feet, being in Baden 350 cubic feet.

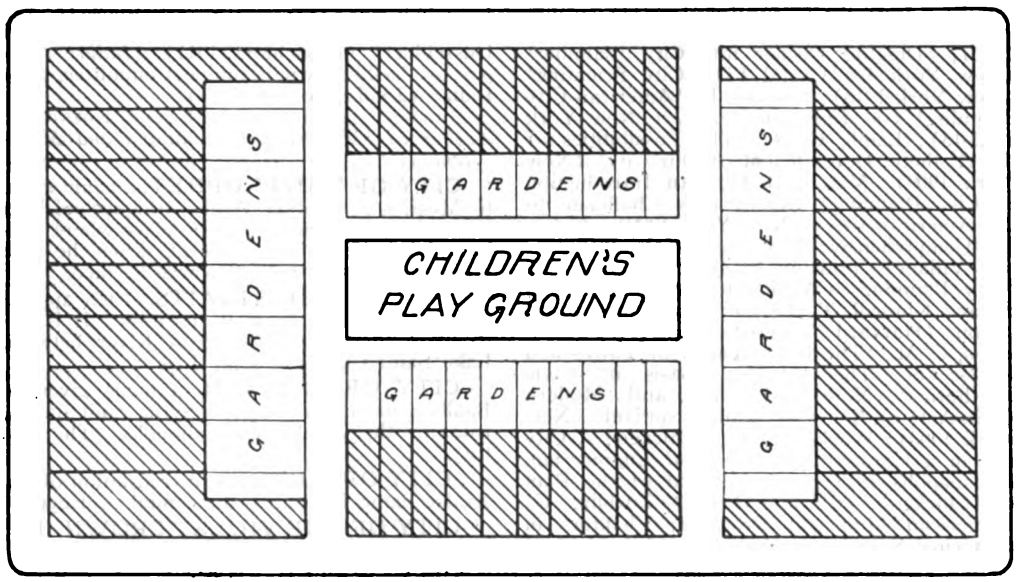
Block and Zone Systems.— The regulations as to space not built upon are sometimes based on the number of families occupying a

building. In Altona, 160 square feet per family must be left open in the main portions of the city, while in the suburbs, 1,100 square feet per family are prescribed. Among other rules are those in reference to light, there being provisions to the effect that certain windows of buildings shall receive light at angles of from 30 to 60 degrees over the walls of others, but these regulations are of a somewhat complicated nature and are not easily applied. In London, the right to "ancient light" has had the effect of causing theatres to be built practically underground, so that the highest priced seats are in the gallery near the street level, and the pit is far below.

In buildings in Germany in which the upper floor is 36 feet above the street, two stairways are usually required, though in exceptional instances one is permitted. Every portion of the floor must be within 98 feet of a stairway. All stairways must extend to the roof, or, if the main stairway does not go to the roof itself, an auxiliary stairway at least two and one-half feet wide must be provided to go to the roof. In many buildings the stairs are in a stairway house, that is to say, alcoves or lean-tos at the side of the building, of a fireproof construction. The shape of the stairhalls is regulated and under some circumstances no corner is allowed. The regulations in different cities vary to some extent. In some buildings of more than two floors above the street, the floor must have two staircases, irrespective of their floor area. The main stairways must not be less than three and three-fourths feet in width, while the stairs to the roof and basement must be three feet wide.

One of the difficult problems in connection with the design of buildings in congested or closely built up blocks is to provide light and air for the rear rooms. To obtain a suitable circulation of air is even more troublesome than to secure light. A method adopted with great success for securing the direct circulation of air in blocks is to leave openings at the ends of the blocks. The houses face all four sides of the block, but there are four openings at the rear of the houses on the ends of the block. Blocks of this kind are to be found in cities in England, Holland and in some German cities, notably Bremen. In some blocks the houses only face the sides of the block. The breeze is free to sweep the entire length, there being no houses at the ends. Such blocks are required by ordinance in the cities of Mannheim and Posen in Germany.

A large number of American cities have alleys bordered by dwellings, such, for example, as the city of Allentown, Pa. There the alleys have the form of a capital "H," the two vertical bars of the "H" joining the main thoroughfares. A new block plan was adopted in 1916 (see the illustration). The plan to eliminate all interior buildings and, instead of the middle bar of the "H" in the alley system, to have two narrow alleys, spaced 40 to 50 feet apart, was adopted, thus making an interior plot of this width and about 100 feet in length, the interior being enclosed and used as a playground for the children residing in the block and provided with simple playground equipment.



New Block System, with Children's Playground, Allentown, Pa.

Following the practice in Europe, American cities, such as New York, Washington, Baltimore, Los Angeles, Seattle and Boston have adopted zone or districting systems for dividing the city according to the purposes for which the different sections are best adapted or are already used. This establishment of the zone system is of as much importance in the older cities as in those under development. The number of zones depends largely on the activities of the city and on the extent to which the citizens are willing to submit. Those of European cities are much more numerous than would be practicable in America. For example, Karlsruhe, a city of 150,000 inhabitants, has as many as 16 different zones, while American cities have ordinarily adopted from four to six

zones for their purposes. The following is a workable basis for the extension of the system in the ordinary American city: (1) Residential district, (a) light traffic, no stores; (b) medium traffic, stores; (2) Business district, (a) medium traffic; (b) heavy traffic; (3) Industrial district, (a) 25 to 100 employees per establishment; (b) over 100 employees per establishment; (4) Tenement district, stores and heavy traffic; (5) Warehousing district, heavy traffic. Other articles on city planning will be found under GARDEN CITIES, RECREATION CENTRES.

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FRANK KOESTER,
Author of 'Modern City Planning and Maintenance.'

CITY OF THE PROPHET, a name given to Medina, in Hedjaz, Arabia, the second holy city of the Mohammedans, the place where Mohammed took refuge, in 622, when he fled from Mecca, and the city where he died.

CITY OF THE STRAITS, often applied to Detroit, Mich., from its position. It is situated on that part of Detroit River between Lake Saint Clair and Lake Erie.

CITY OF THE SUN, a name given to Baalbec, an ancient city of Syria, built on the ruins of the Greek city, Heliopolis, "The Sun City."

CITY OF VICTORY, a translation of the Arabic name for Cairo, the capital of Egypt.

CITY OF THE VIOLET CROWN, The, a name applied to Athens.

CITY WATER SUPPLY. See WATER SUPPLY.

CIUDAD, thē-oo-dād, BOLIVAR, Venezuela, city, the capital of the state of Bolivar, on the Orinoco, about 240 miles from the sea, with governor's residence, a college, a cathedral and a considerable trade, steamers and sailing-vessels ascending to the town. Exports: coffee, gold, cotton, indigo, tobacco, cattle, rubber, hides, sugar, asphalt, etc. Imports: manufactured goods, wines, flour, etc. Ciudad Bolívar was founded in 1764. It was first called San Tomás de la Nueva Guayana, but was long known as Angostura ("the narrow") because of its situation at a narrow part of the river. In 1819 the Congress met here, which, under Simon Bolívar, formed the republic of Colombia out of the Spanish states of New Granada and Venezuela. Since then the city has been known as Ciudad Bolívar ("Bolivar's city"). Pop. 11,686.

CIUDAD DE CURA, dā koo'rā, or **CURA,** Venezuela, in the state of Guzman Blanco, 55 miles southwest of the city of Caracas, about

20 miles east of Lake Valencia. It is an 18th century city, but many of its new buildings are modern in style and beautiful in architecture. The streets are broad, many small parks adorn the city and the inhabitants are justly proud of their library. Pop. 12,600.

CIUDAD PORFIRIO DIAZ, pôr-fē'rē-ō dē'äth, Mexico, town in the state of Coahuila, on the Rio Grande, opposite Eagle Pass, Tex., on the Mexican International Railroad, and the Mexican terminal of the international bridge across the Rio Grande. It has a custom-house, army post, large cattle markets and but poor buildings for the storage of fruits or grains. It is situated in an agricultural region, and its trade with the United States consists chiefly in exporting grains, fruit and cattle and in importing manufactured articles. Coal beds near are of value and may cause the establishing of manufactories. It was founded in 1849. Pop. 5,200.

CIUDAD REAL, the name of a province of Spain, occupying the south extremity of New Castile, and of its capital. The area of the province is 7,620 square miles. The surface in general is bare looking, immense plains stretching from the mountains of Toledo to the Sierra Morena. The mountains of Ciudad Real abound in minerals: iron, silver, copper, lead, antimony, cinnabar and coal; also in quarries of marble, jasper, quartzite, granite, etc. Medicinal and mineral springs, both hot and cold, are abundant. The climate is dry, and in the heat of summer very oppressive. The plains and valleys are productive in the vicinity of the rivers; in favorable seasons good crops of cereals are obtained. Cattle, sheep and mules are reared. Woolen, linen and other fabrics, hardware, earthenware, esparto, etc., are manufactured; brandy, wine and oil of good quality are made. Metals, manufactured goods, brandy, wine and oil, horses, mules and cattle are exported. The city of Ciudad Real is situated on a low plain near the Guadiana, 100 miles south of Madrid. The walls are in many parts in ruins. The principal edifices are the church of Santa Maria del Prado, consisting only of a single nave, but so grand and lofty that no other in Spain, except the cathedral of Coria, equals it; the hospital; the institute, with a good laboratory and botanic garden. The manufactures and the trade are of little importance—the former of woolen and linen cloths, the latter of grain, wheat, wine, etc. Pop. about 15,000. Pop. of the province about 321,580.

CIUDAD RODRIGO, rōd-rē'go, Spain, fortified town in Leon, on the river Agueda, eight miles east of the Portuguese frontier. There is a castle dating from the 13th century. The cathedral was begun in 1190 and contains many interesting features. Ciudad Rodrigo was a place of considerable importance in early Spanish history as a frontier fortress. It was taken by the English in 1706, during the war of the Spanish Succession, and recovered by the Spaniards in 1707. The fort was surrendered to the French under Ney, 10 July 1810, having been bombarded 25 days; and 19 Jan. 1812 it was taken by storm by the British under Wellington, after a siege of 11 days. The Cortes bestowed upon Wellington the title of Duke of Ciudad Rodrigo. Pop. about 9,000.

CIUDAD VICTORIA, vīk-tō'rē-ä, Mexico, capital of the state of Tamaulipas, on the main line of the railroad which runs from Tampico to Monterey, about 100 miles from the Gulf coast. It is in a sugar and fruit-growing region, but the sugar only is exported. It is an episcopal see and the residence of a consular agent of the United States. The city was founded about 1750 under the name of Santa María del Refugio de Aguayo, and not until 1825 was its present name adopted. Pop. about 11,000.

CIVETS, a family of small carnivorous mammals, the *Viverridæ,* related to both the hyenas and the cats. Their alliance to the former appears when the fossil history of the family is traced back to the early Tertiary, where the ancestry of both converges. The comparatively coarse hair and erectile mane possessed by some species, and dentition, are still hyena-like; while the slender, elongated form, long tail and especially the fact that the claws are semi-retractile, exhibit the inborn likeness to the cats. The civets vary from two to three feet in length, and most of the species are strongly marked in black and white stripes and spots, sometimes prettily disposed. They are distributed throughout the warmer parts of the Old World, abounding in Africa and the Malayan Islands, but are absent from the Australian region. The family is divisible into two groups, one of which includes the typical civets; the African genets, one species of which also inhabits Spain and Italy; the linsangs and other Oriental spotted forms and the paradoxures. The second group includes the mungoos and other ichneumons, suricates and the like. These various forms will be found described elsewhere under their separate names.

Civets feed upon smaller mammals, birds' eggs, lizards and snakes, and are considered beneficial because of their appetite for crocodile eggs, which they devour in great quantities along the Nile. They are characterized by, and chiefly valued for, an odorous, fatty substance, contained in a pouch connected with the sexual organs, in both sexes. This substance is used for compounding perfumes, and is ready for use after it has been drained, washed and dried. It is called "civet." Shakespeare refers to it as "of a baser birth than tar, the very uncleanly flux of a cat." A dram is obtained at a time from each animal, from which it is taken at intervals of a few days. Many thousand ounces are annually imported into London. Pure civet is valued at about $10 an ounce. The American "civet-cat" is the cacomistle (q.v.), which is not a true civet, but nearly related to the raccoons.

CIVIC CROWN, among the Romans, the highest military reward assigned to him who had preserved the life of a citizen in battle. It bore the inscription *Ob civem servatum,* that is, "for saving a citizen," and was made of oak leaves. He who was rescued offered it, at the command of his leader, to his preserver, whom he was bound to honor afterward as a father. Under the emperors it was bestowed only by them. The person who received the crown wore it in the theatre, and sat next the senators. When he came in all the assembly rose up as a mark of respect. The Senate granted to Augustus, as a particular mark of honor, that a civic crown should be placed on the pediment

of his house, between two wreaths of laurel, as a sign that he was the constant preserver of his fellow-citizens and the conqueror of his enemies. Similar honors were also granted to the Emperor Claudius.

CIVICS AND CIVICS TEACHING. Civics is now a term broadly applied to the activities of the citizen in his relationship to the state and society. When it first came into use it was generally interpreted to mean the relationship of the citizen to the state and supplanted the earlier expression "civil government."

Along its broader definition it now includes a wide variety of forms. Thus we have its use as:

(1) Civics, sometimes modified by the word political, and interpreted to mean a study of governmental machinery.

(2) Civics, including the first definition and adding thereto the idea of the duties of the individual to the state.

(3) Community civics, emphasizing strongly the idea of the relation of the citizen to the immediate environment in which he is living, and ultimately the state and the nation, with the many obligations which they entail — political, social, industrial, and moral or ethical.

(4) Social civics, stressing the duties of the citizen to society and social betterment, with emphasis on social agencies, but little attention to governmental machinery.

(5) Industrial civics, emphasizing the relation of the citizen to industries.

(6) Moral or ethical civics, pertaining to citizens' activities with relation to the moral or ethical standards of himself and his fellows.

Each one of these many conceptions or subdivisions of civics has grown out of the original conception of civics as civil government. It was not until after the middle of the 19th century that the idea of teaching civil government in the schools or colleges took any root at all. Previous to that time it was felt that the ordinary citizen would derive his knowledge of government by actual participation in it when he reached the voting age. This was always an ineffective method of instruction, but its defects were only forcibly made clear when immigrants began to swarm into the United States in the middle and latter half of the century. Teachers' organizations and judicial officers soon detected the danger of allowing such people and their children to remain in ignorance and began a campaign for the introduction of the study into the schools.

The colleges gave them no encouragement or assistance, for it was at a time when literary education had strongest hold on those higher institutions and the utilitarian was rigidly excluded. The agitation, therefore, met with but little success. Schoolmen in general evinced little interest in it, and it was only in the early eighties that the Constitution of the United States began to be put into the backs of history textbooks of the elementary schools and the pupils were given some instruction in government.

Progress in the subject, however, was slow until an impetus was given from above. The colleges had shown themselves singularly obtuse to the study of political science within their own walls, and it was only in the middle of the late eighties that the subject began to make headway there. Once that men and women connected with higher institutions began to take an interest in the subject, the way for the introduction of the study of government in the lower schools was made easy.

The whole curriculum of secondary education was made the subject of a study by a Committee of 10 of the National Education Association from 1890 to 1893. A sub-committee was given the subjects of history, civil government and political economy to deal with. This met at Madison, Wis., in December 1892, and was known as the Madison Conference. It made the following remarks and recommendations:

> "Civil government is pursued at present in very few grammar schools,— certainly in not more than one-sixth of those which have come under our observation. It is, however, rather a frequent subject in high schools, about one-third offering some sort of instruction in it. In actual teaching it seems little associated with history; it is usually simply a textbook study during a part of one year; and very few of the teachers seem to be familiar with the subject."
>
> "Resolved, that to American history be added the elements of civil government."
>
> "That American history and civil government be taught in the last year of the elementary school and in the last year of the high school."

In 1895 the Committee of 15 of the same Association, which considered the subject of elementary education, recommended: "The study of the outlines of the Constitution, for 10 or 15 weeks in the final year of the elementary school." In 1897 the Committee on Rural Schools recommended that "some work in civics should be taken up" with children between the ages of 9 and 13 years, and that for those between 11 and 13 "duties to the native land, treating under this title the organization and principles of our form of government (civics)" should be taught. "As a preparation the teacher should carefully read some systematic treatises on ethics and civics."

In 1899 a Committee of Seven of the American Historical Association recommended the study of civics along with or separate from the course in American history in the last year of the high school course. In 1910 a Committee of Eight of the same Association, especially appointed to consider history in the elementary schools, made a statement "that elementary civics should permeate the entire life of the school" and recommended a course of study for it through grades five, six, seven and eight, to be taught in connection with history.

The subject had by this time become thoroughly established in the colleges and secondary schools. In the colleges the courses in government had been introduced gradually through the eighties and nineties, usually, however, under the control of the professors of history, and sometimes even denominated as history courses. The separation of courses into distinctly history and distinctly government courses took place rapidly in the colleges, but in the secondary schools the combination lingered.

In 1908 a Committee of Five of the American Political Science Association and a Committee on Civics of the New England History Teachers' Association strongly recommended a course in civics for high schools which should be separated from the history course, and in 1911 a Committee of Five of the American Historical Association made recommendations to the same effect.

Organizations outside of academic circles began campaigns for the more effective teaching of civics in school and college. The most prominent of these was the National Municipal League, which in 1901 began a series of reports on college work in government and in 1905 published a syllabus for elementary and secondary schools.

Following the activities of this organization the Bureau of Education at Washington appointed an agent in civic education and a special committee issued a report in 1915, urging the teaching of civics in elementary and secondary schools along somewhat new lines. This report urged that emphasis be placed on "Community Civics." "The aim of community civics is to help the child to know his community . . . what it does for him and how it does it; what the community has a right to expect from him, and how he may fulfil his obligation; meanwhile cultivating in him the essential qualities and habits of good citizenship."

Meantime the American Political Science Association had a new Committee of Seven at work, and in 1916 it published the most complete survey to date covering instruction in civics or government in elementary schools, junior high schools, high schools, colleges and universities. It summarizes all activities up to the present and makes constructive recommendations.

In spite of the commendable activities of these various bodies progress in the matter of getting thorough courses in civics introduced into the rural schools, elementary schools and high schools has been slow and yet the progress when considered over half a century has been very great.

The entrance of the United States into the war in 1917 awakened the public to the fact that there has been great neglect in putting into operation the recommendations so urgently pushed by the associations mentioned above, and now (1918) there is evident in many parts of the country a desire to do that which has been so long neglected.

The greatest difficulty encountered has been the lack of teachers properly prepared to teach the subject. Women, who form the overwhelming proportion of the teaching force, have, probably from the fact of their exclusion from participation in the active life of government, failed to evince any active interest in the subject. Such teaching as has been given has been of a purely formal kind from a textbook. At the time of the earliest introduction of the subject, instruction usually consisted of reading or studying the Federal Constitution and sometimes even committing it to memory. The very nature of its introduction in the form of an appendix to a history of the United States scarcely permitted of any other kind of method and even the proponents of its introduction seemingly had no conception that it could be taught in any other fashion.

Gradually separate textbooks were published, but these at first consisted of commentaries on the clauses of the Federal Constitution. The State and local governments were almost entirely neglected. Even when these subjects were added, as they gradually came to be, instruction was of the most formal and uninteresting kind.

Any other kind of teaching demanded of the teachers was impossible to have for the reason that they did not know the subject except from a text. The better prepared teachers began to teach the subject of government as it was actually carried on and the demand for that kind of instruction kept growing. This was difficult to get because civics, of all subjects, was one which demanded for its successful teaching a thorough preparation and the habit on the part of the teacher of keeping abreast with the news of the day.

The confusion of counsels in the ranks of its protagonists kept even the best prepared teachers from doing effective work. Those who had recommended that civics be taught as a part of history played into the hands of school officials who were only too glad to tack it on to another subject, so as to avoid taking away time from other subjects in the school curricula.

In such a position the teaching of the subject usually became nothing more than a study of constitutional history and such knowledge of actual government as was obtained by the pupil could only be had by cramming the subject just before an examination. Even with the best of prepared teachers the subject under such circumstances inevitably became one of the study of machinery rather than of the functions of government.

It was largely to remedy such a condition of affairs that the study of community civics was introduced. Through this medium the pupil was to look about him, find out for himself what the government was doing for him and through that means approach the study of the agency of machinery of governmental activity. This method of study led to the consideration of municipal activities first and then quite naturally to the work of the State and Federal governments.

This brought to the subject an interest on the part of pupils that they had never before had. They visited local governmental agencies, executive, legislative, judicial; witnessed the numerous industrial, charitable, educational and social activities of their local government; kept note and scrap books; took a keen interest in current events on which they were quizzed; had debates on political issues; subscribed and read the daily newspapers and weekly or monthly periodicals; listened to talks by public officials; took part in mock conventions and so on.

Actual experience showed that many of these methods could not be carried out in all centres and in others they were pushed to extremes. The sordid nature of a police court in a large city was not the best introduction to judicial institutions, and moreover political officers soon got tired of having a veritable mob of school children of all ages swarming over their buildings and offices. While only a few teachers were doing it, it was well enough, but when it became a daily or weekly, or even monthly, practice, for many it became distasteful.

There has been, therefore, a reaction from the extremes of this system even by its advocates, but as a method of instruction it has aroused interest. The time consumed and its interference with the work of other teachers were not the least objections.

The time given in class to the subject in elementary schools where it is best taught is

combined with language study, geography and history, in the first four grades, while in the fifth and sixth grades 20 minutes a week are given to a separate study of it; in the seventh grade 40 minutes and in the eighth grade 60. In the best high schools five periods a week of 45 minutes for 20 weeks or three periods a week for 40 weeks are given to the subject. Sometimes it is taught parallel with the United States history and at others it follows.

The methods of instruction in colleges and schools have been undergoing great improvement in recent years though civics is far from being generally well taught in the schools. The improvement has generally come in those schools where the object of the teacher has been to get away from the dry résumé of officers and official duties to a study of functions. These have been studied by the use of current newspapers and periodicals, public documents and official notices, visits to legislative assemblies and courts, and in the employment of a great variety of means to interest the pupil in the living organization of governmental functions.

In many schools the classes and whole school have been organized into "School Cities" or "School States" and the pupils given a share in the government of the school. All of these methods along with many others have served to vitalize the study of the subject and to make for a good training in citizenship.

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JAMES SULLIVAN.
New York State Historian.

CIVIDALE, chē-vę-dä'lā, Italy (the ancient FORUM JULII), town of Venetia, in a basin of the Julian Alps, eight miles east-northeast of Udine near the Austrian border. It consists of the town proper, surrounded by walls and ditches, and of fine suburbs; and has among its edifices a large cathedral of the 15th century, with three Gothic portals, a curious baptismal font and several fine paintings; a museum of antiquities, and a record office with some very ancient characters. The neighborhood abounds in interesting antiquities. The Natisone, which flows through the city, is crossed by a 15th century bridge. The modernized city has a military training college, and silk, cotton and linen factories. Pop. 10,031.

CIVIL ACTION, an action brought in the civil courts for the recovery or protection of private or civil rights, or damages for their breach. The two great classes into which actions are divided are civil and criminal. In civil actions either a government or a private individual may be plaintiff or defendant; while criminal actions are always brought in the name of the government.

CIVIL CORPORATIONS. See CORPORATIONS.

CIVIL DAMAGE ACTS, legislative acts passed in several of the States, giving to husbands, wives, children, parents, guardians, employers and others who have sustained injury in person or property or means of support, by an intoxicated person in consequence of such intoxication, the right of action against the person who sold or gave away the liquor which caused such intoxication. Such acts have been held to be constitutional. In some cases the right of action has been extended to the owner of the premises where such intoxicating liquor has been obtained.

CIVIL DEATH, a legal term applied to a person who on account of some crime, has been convicted and sentenced to life imprisonment, thereby losing all his civil rights, and is considered in law, dead. In some jurisdictions a person convicted of murder and sentenced to life imprisonment is considered in law as dead.

CIVIL ENGINEERING. In order to understand clearly what constitutes civil engineering, it will be desirable to consider briefly the steps by which the different branches of the engineering profession have developed and have become differentiated from one another. The profession of engineering in some form is as old as the human race, for some form of building, some utilization of the materials and forces of nature, has always been necessary in order that man might protect himself against the elements and sustain himself in the conflict with nature. Up to about the middle of the 18th century there were but two recognized branches of the profession, the civil and the military. (See ENGINEERING, MILITARY). The former included all those branches of the constructive art not directly connected with military operations and the construction of fortifications; while military engineering concerned itself with the applications of science and the utilization of materials in the art of war. But during the last third of the 18th century, there came a remarkable series of mechanical inventions, such as the spinning jenny by Hargreaves, the spinning frame by Arkwright, the mule by Crompton, the power loom by Cartwright, the modern steam engine by Watt, the puddling process for making wrought iron by Cort and others. These were followed in the first third of the 19th century by the development of the steam locomotive by Stephenson and of the steamboat by Robert Fulton. These discoveries led to the inauguration of the age of steam transportation by rail and by sea. The era of railroads began, for all practical purposes, with the victory of the "Rocket" in the competition at Rainhill in 1829. Improvements rapidly followed in the various fields of manufacturing and in methods of producing iron and steel.

The Field of Civil Engineering.— The Institution of Civil Engineers of Great Britain was established in 1818, and its first president, Thomas Telford, described civil engineering at a meeting of the Council 4 Jan. 1828, as "the art of directing the great sources of power in nature for the use and convenience of man, as the means of production and of traffic in states, both for external and internal trade, as applied in the construction of roads, bridges, aqueducts,

canals, river navigation and docks, for internal intercourse and exchange; in the construction of ports, harbors, moles, breakwaters and lighthouses; and in the art of navigation by artificial power for purposes of commerce, and in the construction and adaptation of machinery, and in the drainage of cities and towns." But the improvements and inventions above referred to soon led to the differentiation of several branches from the parent stem of civil engineering, which up to that time had included all branches of the constructive art, excepting those for military purposes. The "construction and adaptation of machinery," referred to by Telford, soon became a field by itself, which is known as mechanical engineering (q.v.) and which is distinguished from civil engineering by the essential characteristic that it deals with machinery. The rapid development in the manufacture of iron and in the production of the various metals from their ores soon led to the differentiation of metallurgical and mining engineering (q.v.). Architecture, which up to the 18th century had been considered a branch of engineering, had already become a profession by itself. Thus, until about the middle of the 19th century, the branches of the engineering profession were civil engineering, mechanical engineering and metallurgical and mining engineering. The last half of the 19th century, however, has probably witnessed a greater advance in the utilization and application of the "sources of power in nature for the use and convenience of man" than had occurred in all previous history, and various other branches of the engineering profession have become specialties. For instance, within the last quarter of a century the perfecting of the electric motor and the other great discoveries in electrical science first led to the development of electrical engineering (q.v.) as a distinct profession, while later the increasing importance of the applications of chemistry in manufacturing has produced the chemical engineer, a combination of chemist and mechanical engineer, and the advance in sanitary science and the discoveries with reference to the nature, causes and prevention of disease have resulted in the development of sanitary engineering (q.v.) as a branch quite extensive enough to constitute a profession by itself, though it is still considered a branch of civil engineering.

The term civil engineering has, therefore, two distinct meanings. In the widest and oldest sense it includes all non-military branches of the engineering profession as it did a hundred years ago; but in its narrower, and at the present day more correct, sense, it includes those branches of the profession which are left after the separation from the main stem of mechanical engineering, electrical engineering and metallurgical and mining engineering. But even in this restricted sense, what is properly included under the title of civil engineering remains undoubtedly the widest in scope of the four great branches of the engineering profession, and in practising it a man must become a specialist in some one or in several narrower fields. These fields may be enumerated as follows:

1. The construction of railroads, now one of the largest fields both in number of men engaged and in capital invested. The work of the civil engineer comprises the location and construction of the railroad, with all its various structures, such as bridges and buildings, and also the maintenance of the railroad. The motive power is the field of the locomotive engineer and is a branch of mechanical engineering.

2. The construction of street and interurban railways, a branch of civil engineering which touches on the field of electrical engineering and may even be properly considered to belong to that field rather than to civil engineering, inasmuch as all street and interurban railways are at the present time operated by electricity. The construction of the track and structures, however, aside from the motive power and its applications, is properly a branch of civil engineering.

3. The construction of highways and of city streets and pavements. This has always been an important field of engineering, for the highways of a country, as Macaulay remarked, are a good index of its civilization; but with the advent of the modern automobile, the construction and maintenance of highways and of city streets have become of even greater importance. In the application of various materials and bituminous products for the road surface, this branch of engineering touches on the field of chemistry.

4. The improvement of rivers and harbors, the construction of canals, of lighthouses and other works necessary for carrying on maritime trade and commerce.

These four fields constitute the field of transportation engineering.

5. Structural engineering, which comprises the construction of bridges, aqueducts, steel frames for buildings, retaining walls, and indeed all fixed structures with their foundations. This great field of engineering finds its application in all of the other fields, for structures are requisite in all of them.

6. Hydraulic engineering, which includes the development of water powers and the construction of dams and power plants up to the point at which the mechanical engineer is called upon to supply the motors.

7. Irrigation engineering which concerns itself with utilization of waters in agriculture, the diversion of water from streams and its application to the land, with the various structures and appliances necessary for the purpose.

8. Surveying which is necessary in the laying out of works of all kinds in the field, but which constitutes a branch by itself known as land surveying when applied to the object of measuring and subdividing land, and which is known as topographical surveying when the object is to represent upon a map the surface configuration of the land, and which, further, when extended to the survey of very large areas in which the curvature of the earth must be taken into account, leads to the intricate and interesting problems of geodesy, or the measurement of the earth, and touches upon the field of terrestrial physics.

9. A great variety of problems due essentially to the congregating together of people in cities and the necessity for conserving and protecting the public health. This includes works of water supply, sewerage, the disposal of wastes, the drainage of lands and of buildings and the heating and ventilating of buildings. The latter field has recently become the

specialty of the heating and ventilating engineer. The last group of subjects, involving the preservation of the health of communities, has within recent years become the special field of the new profession of sanitary engineering (q.v.).

The above enumeration will make clear the vast extent of the field of what is still properly termed civil engineering, and will make it evident that this field touches at many points the other engineering professions and that the various specialties themselves are in some cases closely related and yet divergent. In the construction and operation of steam railroads and electric railways, the work of the civil engineer comes in many ways into relation with that of the mechanical and with that of the electrical engineer. The same is true in the development of water powers, the construction of pumping stations for waterworks and the design of canal and harbor works and docks with the necessary operating machinery. In problems involving the construction of the foundations and steel frames for high buildings, the civil engineer comes into intimate relations with the architect, with whom he must collaborate. The work of the sanitary engineer also comes in many ways into relation with economic, sociological and legal problems of great importance and difficulty.

Training and Education.—We may next inquire as to the qualities which fit a man for success in this profession. In the first place, it is evident that the ideal civil engineer must be a scientific man and at the same time a business man. He must have a thorough knowledge of the laws of nature, the fundamental principles of mathematics and mechanics and the materials of construction, for his work consists in applying those laws, principles and materials so as to make them of use in the world's business. He must be essentially a man of action. The engineer takes the discoveries of the scientist in his laboratory or the bookworm in his study, and makes them available for the use and convenience of man. His dominant quality must be practical common sense, combined with habits of care and accuracy, and with the courage and training which will enable him to solve new problems and to meet emergencies with success. His mistakes may be very costly and his opportunities for effecting economies by skilful design and construction are very great.

It is often assumed that in order to be a successful engineer a man must be a fine mathematician. As a matter of fact, while the engineer should be thoroughly familiar with the fundamental principles of mathematics up to and including the calculus, he seldom uses any but the simplest applications. In geometry, and especially in trigonometry, he must be thoroughly at home; but the essential characteristic of his knowledge of these subjects is his ability to use them and his perception of their value as tools, rather than his power to indulge in elaborate mathematical refinements. The engineer must know how to use mathematics, but he must possess in addition other mental qualifications which are of far greater consequence; for mathematics is in its essential conceptions and methods an abstract science and the great mathematician is apt to lack the qualities of action, the quick decision, the accurate judgment, the ingenuity in meeting and overcoming obstacles and the natural grasp and insight leading him to see the physical possibilities of a situation, which must distinguish the successful engineer. On the other hand, the engineer should have a liking for mathematics, and a quick and instinctive grasp of its principles and methods, together with the insight which will enable him to see how they are to be made of use and to use them properly when the time comes.

The training of the engineer must be mainly a training in science, and such a training tends to develop the quality of honesty. The only aim of the true scientific investigator is to arrive at the truth concerning the phenomena he is studying. Such a training, if combined with business ability, makes the very best administrators, and, whether for this reason or not, engineers are being more and more sought after to fill administrative positions, especially in connection with corporations in which engineering is concerned. On the other hand, the early practice and associations of the engineer are often of a character which fails to produce polished manners or a good address and appearance, the lack of which is sometimes a great handicap.

There have been, and are, two ways of preparing for the practice of this profession. The first is to begin by getting a thorough technical training in a good engineering school, in the principles underlying the profession. The second is to begin as an apprentice or student in an engineering office, gaining experience and studying at the same time. A man may become a good civil engineer by either method. Which method is the better will depend upon the man. If he can take a college course and not become demoralized by the opportunities for slack work, the lack of responsibility and the rather low standards; if he can maintain his sense of perspective and avoid intellectual arrogance; if he can really master thoroughly the things which he studies and not simply learn to repeat by rote, he will find a college education to be the best and quickest preparation for the engineering profession. He will find there offered the opportunity to learn many things which many men never learn in practice, the opportunity to become acquainted with engineering literature, to gain habits of study and breadth of view, and the adaptability of mind to enable him to select the best way of solving a new problem. But many young men have not the opportunity to go to college, and many also learn better when, from day to day in their actual work, they see the necessity for learning; others would become indifferent or lazy in a college atmosphere. For such men the second method may be adopted, and if they take advantage of the many opportunities now offered for self-culture, such as evening courses, correspondence schools, industrial and manual training schools, etc., it is possible for them ultimately to become just as good engineers as by the first method. The Franklin Institute in Boston, for instance, offers evening courses in most branches of engineering, including not only civil engineering but mechanical engineering and electrical engineering, in some of which courses the students are carried as far into the subject as in some of the large engineering schools. Similar op-

portunities are offered in the Wentworth Institute of Boston, the Mechanics Institute and the Cooper Union in New York, the Pratt Institute, Brooklyn, and other schools where instruction of high quality is offered and taken advantage of by many young men who are working and earning their living during the day time.

The young man, however, who aims to become a civil engineer should endeavor to secure a broad training and a wide outlook, not directed entirely to technical subjects, but covering also those subjects of a general nature which are necessary for every thoroughly trained man. The engineer of the past has too generally been considered a mere builder, and he has not, as a rule, been given the position to which his responsibilities and his achievements legitimately entitle him; but the engineer of the future should aim to take a position in society and business as a cultivated and highly trained man, on a level with men in any of the other professions.

A broad and thorough education can now be obtained at many schools in this country. Many educators would advise a young man to take first a college course and to supplement it by a course in a professional school. Another plan which has its advantages is to lay out a course longer than the usual college course, in one institution, directed from the beginning toward the end in view, some general subjects and some professional subjects being studied in each year, with an increasing proportion of the latter toward the end of the course. The latter plan has the advantage that the student is working always toward a definite end, provided he is able to decide at the beginning what general line of work he desires to pursue. Some of the technical schools of the United States have provided courses of five years or more, in which the student may gain a technical training and a liberal training at the same time. If a young man is unable to decide upon a profession at the beginning of his course, whether he goes to college first or not, he should at least decide within broad limits, in order that he may arrange his studies so as to avoid unnecessary waste of time when he finds himself able to make a definite choice.

The University of Cincinnati, with the cooperation of a number of establishments or firms which employ young engineers, has adopted the novel system of having its students alternate between the school and some practical employment, spending a certain period exclusively in each place. In this way the student is made to see the use of what he is learning and to realize that the entire value of what is learned depends upon the ability to use it, which is frequently lost sight of or not perceived at all in the usual college or technical school. This experiment is a most interesting one as a method of training engineers.

It is not, at the present time, necessary to go abroad in order to obtain a technical training in civil engineering. Our American schools now offer better preparation for the practice of the profession in America than can be obtained elsewhere, being well equipped and teaching American methods. Twenty years ago this could not be said, but at present our technical schools are as good as any in the world. Fortunately, also, many of them offer scholarships or other aids to needy but capable young men, so that the lack of money need not prevent a persevering man from gaining a technical education.

The Civil Engineer.— The opportunities presented to a young man graduating from one of our engineering schools, or prepared by self-training or at one of the evening schools referred to, will be many and varied. All professions are overcrowded in the sense that there are men in them who cannot find employment, and this is true in civil engineering. Yet there are few professions which offer so many opportunities to properly qualified men, so that, properly speaking, it is very far from overcrowded. The young civil engineer will, moreover, find open to him many purely business positions for which his training has fitted him. The range of the engineering professions is continually widening, one direction in which they are rapidly extending being that of administration. Within the past 60 years nearly the entire railway system of this country has been built, most of our factories started and our works of sewerage and water supply constructed. The construction of these works has required the services of most of our engineers, while the opportunities of profitable employment here have attracted many members of the profession from foreign shores. The civil engineer of the past has thus been mainly a constructor; but the civil engineer of the future will be more and more of an administrator as well. And while the construction of railroads will not proceed as rapidly in the future as it has in the past there are certain directions in which construction will still proceed with great activity. For instance, although the great era of railroad construction may be said to be substantially ended, there is still much work to be done in building branch lines, in double tracking existing lines, in reducing grades and curves, eliminating grade crossings and making other local improvements, often on a large scale. Moreover, the construction of urban and interurban electric lines, the building of subways and tunnels for rapid transit in cities and the improvement of steam railroad terminals, is proceeding at a rapid rate and will require the expenditure of many millions of dollars; while the rapid growth of urban population and the advances in sanitary science have recently given a great impetus to the construction of works for supplying pure water and for disposing of the sewage and other wastes without injury to the public health. Enormous projects requiring the services of hundreds of engineers, for 5 or 10 years are sometimes necessary for supplying one of our great cities with water which has sometimes to be brought hundreds of miles.

But in addition to works of construction, which in the past have utilized the greater part of the energy of the profession, it is becoming more and more recognized that the man with a good technical training, if he have also a talent for organization and executive ability, and if he be possessed of that greatest of all gifts for the engineer, common sense, is the best type of man to direct the work of our great industrial corporations, many of which are dependent for their success upon sound engineering judgment. Some of our large railroad corporations have within comparatively

few years instituted the practice of choosing their higher officers from their engineering corps, instead of from other branches of the service. Not a few railroad presidents began their careers as civil engineers, and the number of such men will increase in the future.

With respect to financial remuneration, the civil engineer stands at an advantage compared with the members of some professions, in the fact that his services are in demand at the outset at a fair salary, while the young doctor or lawyer is not able to meet his expenses for some years. The ultimate financial possibilities presented to the engineer may not be as great as in the professions referred to, but the rewards are still sufficient to tempt even the most ambitious men, while there are few impecunious engineers. The engineer will be appreciated more and more as time goes on. The profession is a growing one, with great possibilities, and few careers offer greater inducements or a surer or truer success to the energetic and capable young man, for we live in a mechanical age, and the work of the man who can "direct the great sources of power in nature to the use and convenience of man" must continually increase in importance.

GEORGE F. SWAIN,
Harvard University and the Massachusetts Institute of Technology.

CIVIL LAW, The. 1. Introduction.— The term Civil Law (*Jus Civile*) is commonly and popularly used in several distinct senses. Thus we distinguish it on the one hand from the *Jus Gentium* and on the other hand from the *Jus Naturale*. Again our municipal law is called the civil law, and further we distinguish between civil and criminal law on the one hand and civil and canon law on the other. But it is here used as referring to the whole body of Roman law (the *Corpus Juris Civilis*), having its proper origin contemporaneously with the genesis of the Roman state and coming down in ordinary generation, from century to century, through the regal period, the republic and the empire to the codification of Justinian and Napoleon.

When we speak thus of the Civil Law we mean the whole system of usages and rules of private law adopted by the Roman people; their *jus privatum* as opposed to their *jus publicum* (including criminal and sacred law). The *Corpus Juris Civilis* as left by Justinian was the result of a gradual modification and enlargement of the code of the XII Tables under three great influences — the Jurisconsults, the Prætors and Legislation. The institutional definition of the *jus civile* as the peculiar law of Rome, in contrast with the *jus naturale* and the *jus gentium* is a mere philosophical flourish; by late writers *jus civile* was confined to the *responsa prudentium* alone; what the Roman jurists had chiefly before their mind when they used the expression was the old law of the XII Tables, as contrasted generally with the newer development of the *jus honorarium* (Hunter, 'Roman Law,' 24).

Thus the Roman law presents two aspects, each perhaps equally deserving the attention of the student of jurisprudence. From one point of view it furnishes the sound and scientific basis of the greater part of the modern law of all civilized mankind, and has long proved an inexhaustible storehouse of legal principles. On the other hand, it forms a connecting link between the institutions of our Aryan ancestors and the complex organizations of modern society. In its ancient records it takes us back to the very inception of civil jurisdiction, and tracing it down for more than 2,500 years from the Rome of Romulus and Servius Tullius, we see it constitute a legal development not matched in the history of the law of any other people. The oldest fragments of the Roman law that have come down to us are ascribed to the period of the kings, but these are essentially traditional and practically insignificant, and we take the XII Tables as the first solid ground in the history of the Civil Law.

2. The Law of the XII Tables.— About the year 450 B.C. a commission from Rome visited Greece for the purpose of collecting information necessary to draw up a written code of laws. This fact suggests a foreign or Greek extraction for at least a part of the oldest body of Roman law, although it must of course be conceded that the XII Tables undoubtedly contained much law of indigenous growth. Three centuries had intervened between the founding of the city and the promulgation of the law of the XII Tables. During this period a certain body of local, customary law had inevitably developed, some part of which must have been incorporated into this first written code. Until the time of Diocletian (245–313 A.D.) professional lawyers, strictly so called, were not known in Rome. The business of practising law, so to speak, had been up to that time regarded as a public office, which each citizen might be called upon to undertake; but about that time there began to grow up in Rome a class of men among the patricians who made it their business to know the law. Pomponius in his history of the Roman law, written about the middle of the 2d century A.D., informs us that the custody of the XII Tables, the exclusive knowledge of the forms of procedure and the right of interpreting the law belonged originally to the College of Pontiffs, a patrician order, at the head of which was an officer known as the Pontifex Maximus, from which office, it may be remarked in passing, indirectly and by a strange and circuitous devolution has come down to our day the office of the Pope in the Roman Catholic Church. Only a small part of the language of the substantive law of the XII Tables has been transmitted to our time. Some learned attempts have been made to patch out the substance of each table, but it is by no means certain that the exact fragments of any part of the XII Tables have come down to us in their precise original form and expression. The language has probably been essentially modified by the subsequent Latin usage and by repeated transcription; and the fragments have had to be picked out and pieced together from numerous references in the later literature, as for example from Cicero, Dionysius and Gaius; so that, as matter of fact, what passes for the substance of the XII Tables is probably largely a speculative patch-work, and in its content and significance certainly more or less misleading.

3. The Jurisconsults and the Prætors.— The jurisconsults, a professional class of jurists or legal writers dating from the century before Christ, were given by Augustus an authority and standing which they had not there-

tofore possessed, and from his time much weight is to be attached to the opinions and writings of the more eminent of them. In 426 A.D. Valentinian enacted a law, commonly called "the Law of Citation," providing that the writings of only five jurists,— Papinian, Paul, Gaius, Ulpian and Modestinus, should be quoted as authorities. If a majority of these held one opinion, that was to bind the judge; if they were equally divided, the opinion of Papinian was to be adopted. The great bulk of Roman law as it has come down to us, and all that is most valuable in it, is due to the jurisconsults. The prætor stood in Roman law midway between the jurisconsults and the legislature. At first there was but a single prætor, but later a prætor-urbanus and a prætor-peregrinus (when the empire extended beyond Italy, the number being increased to 18), dividing the jurisdiction among them generally either along the line suggested by their names or territorially. The prætor exercised a qualified or limited legislative power. His right to alter the law was conceded, but it was not unlimited. He was in some sort the chancellor, the keeper of the conscience of the Roman people, or the person who was to determine in what cases the strict law was to give way to natural justice (*naturalis æquitas*).

4. Legislation.— To give an adequate account of Roman legislation would be to write the constitutional history of Rome, something quite beside the purpose of this article. It is important, however, to state that during the republic the popular assembly was the foundation of legislation. During the earlier part of the empire the function of the popular assembly was gradually usurped by the Senate, acting more and more as the mere mouthpiece of the emperor. Finally even this form was dropped, and all enactments were made directly by the emperor. During the republic three assemblies of the Roman people existed,— the *Comitia Curiata,* a patrician body, the *Comitia Centuriata,* composed both of plebeians and patricians — the franchise being on the basis of a property qualification — and the *Comitia Tributa,* which was based on a local division of the people of the city — the vote being given territorially, as if by arrondissements, cantons or wards. The sovereign power was exercised by the emperors in three ways,—(1) by direct legislation (*edicta, constitutiones*); (2) by judgments in their capacity as supreme judge (*decreta*); and (3) by *epistolæ* or *rescripta,* giving instruction on questions of law in answer to applications from the judges.

5. Codification.— The earliest collection of law in Rome was the *Jus Papirianum* of the regal period (*temp.* Tarquinius Superbus), and it was not until 304 B.C. that the full knowledge of the law was wrested from the patricians. The constitutions of the emperors were collected at different times and constituted the first codes. The oldest collection in the form of a code is the *Codex Gregorianus et Hermogenianus,* which covers a period of 200 years from Hadrian to Constantine. Only fragments of it remain. Next we have the *Codex Theodosianus,* made about the year 435 A.D. The Theodosian Code has small pretensions to scientific classification, but it runs to 16 books and has come down to us almost complete. The reign of Justinian (527–65 A.D.) marks the culminating period of Roman law. In collaboration with Tribonian, he prepared, or caused to be prepared, a complete codification of the whole body of the law, first appointing a commission of 10 members to draw up a code along the general lines of the Theodosian Code. This is called the *Codex Vetus,* which was speedily superseded by a later edition and has been entirely lost. Next, about the year 530 A.D., Justinian created a commission of 16 members to collaborate with Tribonian in a codification of the vast accumulation of law that had grown up under the hands of the jurisconsults and the prætors. The commission had to deal with the works of 39 jurists, consisting of 2,000 books and 3,000,000 verses. This matter was finally sifted and reduced to 50 divisions or books, and constitutes what we know as the Digest and the Pandects. For the purpose of providing an elementary or preparatory textbook of the law, a commission was further constituted by Justinian which prepared the Institutes of Justinian, which are in some sort a little more than a revision or a new edition of the Institutes of Gaius. After publishing the Pandects and the Institutes in 534 A.D., a commission was appointed to revise the old code and to incorporate the new constitutions and decisions. This revision was completed in the same year, and promulgated on 16 Nov. 534 A.D. Laws of a permanent character, subsequent to Justinian's codification, were collected from time to time and called Novels.

6. The Justinian Law in the West.— Upon the fall of the Western Empire and the subsequent local disorder and social disintegration throughout western Europe, the civil law fell into disuse in the West, and during the Middle Ages was largely lost sight of; but in the 12th century the study of the civil law was revived at Bologna and spread thence throughout Italy and into France. In 1453, about nine centuries after Justinian, Constantinople was taken by the Turks and the Eastern Empire was overthrown. During some five centuries; or more than half of the existence of the Eastern Empire after Justinian, the law nominally remained as settled by Justinian's legislation, modified indeed by subsequent novels of the emperors; but about the end of the 11th century the Justinian Code fell into abeyance without special abrogation. The great causes of its decay were the change of language from Latin to Greek, the accumulation of fresh law and of commentaries, the authorized readjusting of the whole by several of the later emperors and the overpowering influence of the ecclesiastical or the canon law. The revival of the study of Roman law and the rise of the Bologna school were formerly erroneously attributed to the alleged discovery of a manuscript of the Pandects at the sack of Amalfi by the Pisans in 1137; but it has recently transpired that the study of the Roman law had begun to be pursued with ardor at Bologna and elsewhere in Italy long before that time. However, the manuscript in question, now called the *Pandectæ Florentinæ,* taken to Florence on the conquest of Pisa in 1406, is well known; it is a very ancient and valuable copy of the entire Pandects, being also the only one in existence that dates before the age of the Glossators. The fame of the school at Bologna spread throughout Europe, attracting crowds of students from

all quarters and reviving a vivid interest in the civil law.

About 1135, or a little earlier, the code of Justinian was translated into French, and by the 13th century many French translations had been made of the Digest, the Institutes and the Code. By the 12th century ecclesiastical councils had begun to forbid ecclesiastics to study the secular law (Rheims 1131; the Lateran 1139; Tours 1162). This ecclesiastical inhibition served somewhat to check the study of the civil law at Paris — then as now the chief university town of Europe — and was favorable to the continued predominance of Bologna as the seat and centre of civil law study, to the growth of the Montpellier School and to the establishment of new schools, the chief of which were at Toulouse and at Orleans. All these great schools in France — except Paris — and the numerous schools that sprung up in the succeeding centuries, taught the civil law on the basis of the Justinian text. After the spread of the scientific study of Justinian's works from Bologna to Montpellier and other parts of France, the Justinian law in the 12th and 13th centuries gradually replaced the ante-Justinian, as being the more perfect form of the Roman law. In 1250 France was still divided under two laws; in the south (*pays de droit écrit*) the Roman law obtained, modified by local customs; in the north (*pays de coûtume*) local customs prevailed, slightly modified by Roman law, which, however, was taught in the northern schools and left numerous traces in the legal works of the period. A Dutch school of jurists arose toward the end of the 16th century at the University of Leyden. So, too, in Germany some progress was made in the study of the Justinian law. Like the jurists of other countries, those of Germany were impressed by the superiority of the Roman law to their native law, both in form and substance, and their admiration induced them by degrees to put it forward in practice. The influence of the Bologna revival extended into Spain, where a crude codification was effected as early as 1263, called *Siete Partidas*, but not generally adopted throughout the kingdom until about the reign of Alonzo XI in 1348. The Roman law worked its way into Scotland by way of France. From the close alliance that so long subsisted with France, Scotland, besides borrowing many of its institutions from that country, also "imported a large portion of Roman jurisprudence to make up the deficiencies of a municipal law, long crude and imperfect, and which had made little progress as a national system till some time after the establishment of the Court of Session in 1532 by James V, after the model of the Parliament of Paris. . . . Properly speaking, the teaching of the civil law commenced in Scotland at the Reformation in 1560"; after which date, as well as before it, the more ambitious students of the civil law also availed themselves of the best professional teaching of the continental universities. "In Scotland a knowledge of the Roman law has always been regarded as the best introduction to the study of the municipal law. ... All the best writers on the law of Scotland, such as Stair, Bankton, Erskine and Bell, were able civilians; and though they have not produced separate treatises on the subject, their works abound with admirable illustrations of the Roman law, evincing great learning and research, and a familiar acquaintance with the writings of the continental jurists." (Mackenzie, 'Studies in Roman Law,' 40–41).

The influence of Roman law on the English common law has been very differently estimated by different writers. Mr. Stubbs stands at one pole of the controversy with his eyes shut, saying, "England has inherited no portion of the Roman legislation except in the form of scientific or professional axioms, introduced at a late period, and through the ecclesiastical or scholastic or international university studies. Her common law is, to a far greater extent than is commonly recognized, based on usages anterior to the influx of feudality,— that is on strictly primitive custom." (Stubbs, 'Const. Hist. of England,' I, 10, § 8). This is perfectly insular and manifestly untrue. The other and sounder view as here taken is presented in Reeves' 'History of the English Law,' following Guizot and Mackintosh, and more recently an equally enlightened view has been taken by Pollock & Maitland in their 'History of English Law.' The definite traces of Roman law surviving the Roman domination of the island are exceedingly slight. Selden states that the Roman law wholly disappeared in England until it was reintroduced from Bologna in the 12th century. A little before the middle of the 12th century, Vacarius, a Lombard, went over to England with Archbishop Theobald and lectured on the civil law at Oxford with success. Even Stubbs admits that before the end of the reign of Henry II the procedure of the Roman civil law had become well known by the English Canonists. Henry of Bracton was the first really scientific commentator on the law of England, and the greater and more important part of his work is little more than a transcript of the Roman law. He shows everywhere close familiarity with the *Corpus Juris*. The Novels are not quoted, but the Institutes are referred to, and there are many quotations from the Digest and the Code, while a very large number of passages are incorporated bodily into the text itself and into the tissue of the author's commentary without any statement as to their source. From Bracton and Glanvill to Pollock & Maitland, the predominating influence of the Roman law in English jurisprudence is everywhere traceable and evident. "The English system of equity and the ecclesiastical law have been formed more or less extensively on the Roman law or on the Roman through the Canon law." (Mackenzie, 'Studies in Roman Law,' 40).

Both in England and in Germany the influence of the Roman law was resisted and its predominance looked upon with disfavor, but it nevertheless made its way *pari passu* with advancing civilization in each country, becoming in fact and effect the substantial *corpus juris* of the one country directly and of the other indirectly. Many causes combined to open the way both in Germany and in England for the practical application of Roman law. Among them, especially in England, were the impulse given by the universities and the Oxford School of Civil Law, the recognition of the Roman law in the clerical courts, whose jurisdiction extended over a class of civil matters, and the personal influence of the higher judges, who mostly belonged to the clergy, and were there-

fore versed in the Roman law. Above all, however, was the necessity of supplying the defects of the common law, which had become manifest from the growth of trade, the increase of intercourse and the greater importance of movable property; for the common law had expended its best energies in the completion of the legal constitution of the feudal system, and had showed no tendency toward creating an original commercial law. To these causes must also be added the scientific superiority of the foreign law, with its completeness, over the domestic law, with its want of theoretical development. Even at an earlier period it is not improbable that the Roman law had been used as an assistant and complementary authority in the Curia Regis, upon which court it was incumbent to instruct the inferior judges in regard to the law in doubtful and omitted cases. A legal principle enunciated by that court had authority beyond the particular case in which it was laid down, and became, by means of its actual use, part of the *jus non scriptum, consuetudinarium*. As Roman legal matter obtained reception, although the written sources of the Roman law were not at all received as having a legislative authority, Bracton properly included the former among the *legcs et consuetudines Angliæ*. (Prof. Dr. Güterbock, 'Henricus de Bracton,' etc., translated by Brinton Coxe, 60–62).

7. Code Napoleon.— Some steps were taken during the reign of Louis XIV looking to a codification of the French law. Little, however, was accomplished, and the French people owe to the constructive genius of Napoleon the present scheme of codification, which was undertaken during the consulate at his dictation, and finally completed, one code at a time, shortly after the end of his reign. The Civil Code, which was the first, was enacted and became the law of the land 21 March 1804. It was prepared by a council of jurists assigned by the First Consul to the work; but he himself took great personal interest in it, attending many of the sessions of the Commission and contributing much by his acute suggestions to the form and content of the law. With some fitness he is reported to have said, "I shall go down to posterity with the Code in my hand." This code, called at first the Code Napoleon, but now the Code Civil, has to do with the law of obligations, of persons, of personal status and of property. It contains 2,281 sections, many of them of only a line or two in length, and is comprised in a volume of less than 350 pages. The whole body of law in France at present, substantive and adjective, civil and criminal, is comprised in eight codes, as follows: *Le Code Civil; Le Code de Procédure Civile; Le Code de Commerce, Le Code Pénal; Le Code d'Instruction Criminelle; Le Code Forestier; Les Codes de Justice Militaire*. The scope and purpose of each of these codes is generally and sufficiently disclosed by its title. This codification is supplemented by the *Lois Usuelles*. The sources of the codified law of France are: (*a*) the ancient laws of the realm theretofore in force, consisting of local customs (custom of Normandy, custom of Paris, custom of Brittany, etc.); (*b*) the written or Roman law; (*c*) such legislative enactments of the National Assembly, the Legislative Assembly and the Convention, and such of the Decrees of the Consuls and of the Directory, between 17 June 1789 and 15 March 1803, as were thought by the codifiers to be of permanent value; and (*d*) such general laws as have been enacted since 21 March 1804. The Roman law constitutes the foundation and groundwork of the structure, the other constituent elements indicated being merely subordinate or ancillary.

8. The Extent of the Civil Law Throughout the World.— The civil law in its modernized form and substantially as enacted in the Code Napoleon has, within a century past, become the law of more than three-quarters of civilized mankind. To be more exact, it is thus the law not only of France and of all her colonies, but also of Italy, Greece, Switzerland and all the minor countries of southeastern Europe, of Spain and Portugal, Belgium, Holland and her colonies, of Austria-Hungary, Germany, Norway and Sweden, Denmark, Russia, Mexico, together with all the countries of Central and South America — all of the western hemisphere from the Texas border to Cape Horn — of Scotland and the Philippine Islands, the West Indies and Louisiana, of Egypt, of all the other civilized parts of Africa and of a majority of the more important British colonies, to-wit: Quebec, Ceylon, British Guinea and other English possessions in Africa, and Australasia. It is also working its way into Turkey and her dependencies. The German Empire in 1900 adopted for the empire the Prussian Code, which is a Germanized version of the Code Napoleon; and Japan, as part and parcel of her scheme of civilization, has within recent years enacted a code of law on French lines, following closely even its minor details, thus writing the law of Rome — the Codes of Justinian and of Napoleon — into the jurisprudence of the remote islands of the sea.

9. Resemblance Between the Civil Law and American Law.— Aside from matters of procedure and minor detail, the actual differences between the living Civil Law as it exists throughout the world and the English common law, as refined and modified in this country and now administered here, are not great, certainly not greater than we should reasonably expect, having regard to the controlling influence,— conscious and unconscious — of the Civil Law, upon the growth and development of the common law in England, and having in mind the fact that many English judges, notably Mansfield and Holt, and several of the chancellors for the past 200 years at least, have professedly drawn copiously from the great reservoir of Roman jurisprudence, whenever occasions have arisen for modifying or extending common-law principles or for applying them to new conditions of fact and circumstance. The so-called common law of England, certainly from the 11th century, is, in reality, largely the Custom of Normandy and the Custom of Paris, as imported at the Conquest in 1066 A.D. Its scientific terminology and its exact legal language even in its present form are essentially French. Chief Justice Holt nearly 200 years ago said: "Inasmuch as the laws of all nations are doubtless raised out of the ruins of the civil law, as all governments are sprung out of the Roman empire, it must be owned that the principles of our law are borrowed from the civil law, and, therefore, grounded upon the same reason in many things." (12 Mod.

Rep. 482). Sir William Jones, writing during the Revolutionary War, said: "With all of its imperfections, the Digest is a most valuable mine of judicial knowledge; it gives law at this hour to the greatest part of Europe, and though few English lawyers dare make such an acknowledgment, it is the source of nearly all our English laws that are not of feudal origin." And Mr. Hornblower, addressing the New York State Bar Association (1902), has said: "It is also well for us votaries of the common law to remember that there is another jurisprudence founded upon the Roman or the Civil Law, and prevailing throughout the greater part of continental Europe, from which we have ourselves borrowed many of the most important legal principles." If we eliminate from the law of England, as it obtains in this country, our technical rules of evidence, which have grown up about our system of trial by jury, our pleading and the peculiarities connected with the tenure, transmission and devolution of real estate (which are each of them, for the most part, little more than an antiquated mass of ignorance and rubbish, of which it is the modern tendency of our American jurisprudence to relieve us), the rest of our system is not very different, at least in its elements, from modern Civil Law. The following subjects in American law may be mentioned, which have been largely influenced by the Civil Law, and resemble that system in many important elementary principles, namely, the subject of probate, of succession to personal property and testamentary capacity; the law of admiralty; the law merchant, largely of continental origin; the law of equity and trusts; the law of corporations as juridical persons distinct from corporators; the law of *res judicata,* fully expounded in the Digest of Justinian; the theory and practice of *habeas corpus,* the leading principles of which are found in the same compilation; the law of alluvion, of accession and of wild animals; and finally the great subject of obligations in general as arising from contract, *quasi* contract, tort, neglect and the operation of law, the logical arrangement of which by the civilians becomes more and more useful in legal analysis and discussion. To these we may add the general doctrines of public and private international law which are mainly of continental origin. (Howe, 'Roman and Civil Law in America,' 16 Harv. Law Rev. 342).

10. The Importance of the Civil Law in America.— The present practical importance of the Civil Law to us consists in the fact that about one-seventh part of the present population of the United States and its dependencies — or, to put it in figures, more than 13,000,000 of our population — live under the Civil Law, and are governed in their personal and property rights by some form of it. Thus Louisiana, with a population of 1,700,000, Porto Rico, with a population of 1,150,000, the Hawaiian Islands, with a population of 190,000, the Philippine Islands, with a population of 8,000,000, and Cuba (if indeed it may be included), with a population of 2,050,000, are governed by the Civil Law. Not only. therefore, must our judges and lawyers acquire familiarity with it and facility in working in it, but our commercial and trading classes are finding it constantly of more and more consequence to them in their business. Not only is much of our law derived from it, but many millions of our people live and must continue to live under it. It is a curious fact that the Custom of Paris was in force in Michigan and Wisconsin down to the year 1810, when it was formally abolished, in Michigan at least, by the legislature of that State. (18 Wis. 158; 8 Mich. 25). All the French colonies established in the 17th and early part of the 18th century in North America were governed by the Custom of Paris, which still remains in Quebec the basis of the codified law of that province. By a royal ordinance the laws, edicts and ordinances of France and the Custom of Paris were extended to Louisiana, and that system of law thus introduced prevailed there until 1763, when France ceded the country to Spain. That introduced the Spanish law into Louisiana, which was, however, only another form of the Civil Law. In 1808 a Civil Code was adopted by the Territory of Orleans based to a considerable extent on the Code Napoleon, and, as revised in 1825 and subsequently, constitutes the present Louisiana Code. We probably owe to the study of Blackstone's Commentaries much of the unreasoning prejudice which has hitherto existed to some extent in this country against the study of the Civil Law. Blackstone began to be read by law students in America about 140 years ago, and from then to now has been for the most part the initial textbook for all lawyers and law schools. He writes bitterly in his first lecture about the Civil Law. But it is manifest that he wrote without knowledge and under the influence of a set of political prejudices and with a bias and prepossession with which we in the United States may well have little sympathy. Abstractly, there is no more reason why Americans should entertain a prejudice against the Civil Law than against the law of gravitation, and there are cogent reasons, practical as well as scientific, why we should — now at least when it has become a matter of real personal concern to so considerable a part of our people — give serious attention to modern Civil Law.

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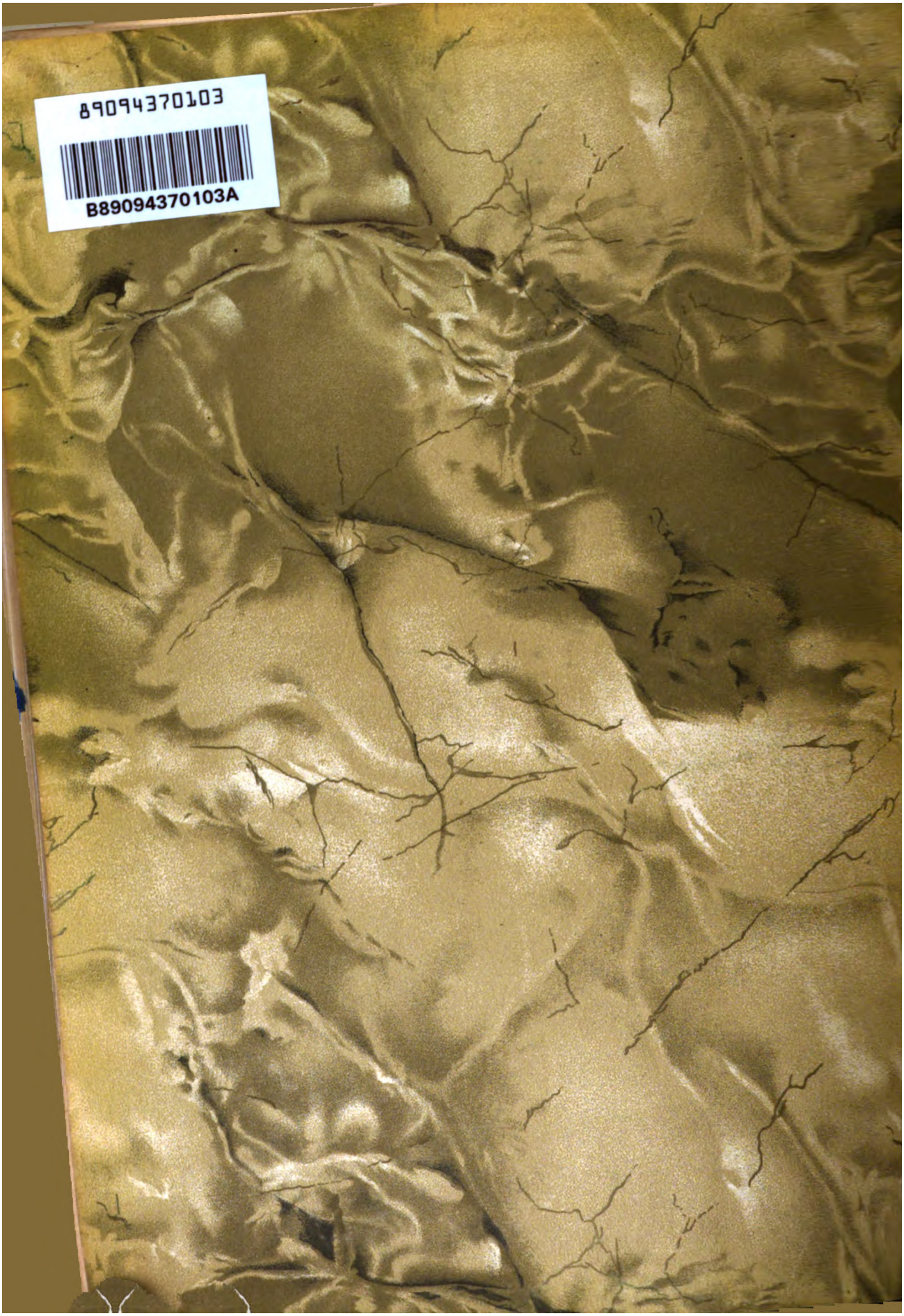
CHARLES F. BEACH,
American Lawyer in Paris; Author of 'Equity Jurisprudence,' etc.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